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Fourth Biennial Report

(New Series)

OF THE

State Board of Health
And Vital Statistics

OF MINNESOTA

1911-1912

SYNDICATE PRINTING CO.,
Minneapolis, Minn.
1914

Office of the State Board of Health and Vital Statistics.
St. Paul, Minn., December 31, 1912.

To His Excellency A. O. Eberhart, Governor of Minnesota.

Sir: In accordance with the law which requires that the Minnesota State Board of Health "shall report its doings and discoveries to the legislature at each regular session thereof, with such recommendations as it shall deem useful," I herewith submit to you a report for the years covering 1911-1912.

Respectfully submitted,
H. M. BRACKEN, M. D.,
Secretary and Executive Officer.

MEMBERS OF THE MINNESOTA STATE BOARD OF HEALTH AND VITAL STATISTICS.

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Introduction

The activities of the Minnesota State Board of Health are now represented by the following:

- a. Administrative Work.
- b. Vital Statistics.
- c. Epidemiology.
- d. Laboratory.
  - Pasteur Institute.
  - Branch Laboratories.
    - At Duluth.
    - At Mankato.
- e. Engineering.
- f. Child Hygiene.
- g. Special Tuberculosis Work.

The administrative work is directed from the office of the Board in the capitol. It consists of correspondence, conferences, advice, investigations, special work and an educational campaign. The possibilities along these various lines are controlled entirely by the funds at the disposal of the Board for such work. It is now a well recognized fact that the function of public health officials is that of preventing illness rather than waiting for the trouble to begin and then trying to cope with it.

The collection of vital statistics is by law placed under the secretary of the State Board of Health as State Registrar. Although Minnesota has been collecting vital statistics returns on births and deaths through the State Board of Health since 1887, it was not until 1910 that it was recognized by the United States census bureau as a registration state. This condition was due to the fact that certain requirements of the census bureau had not previously been complied with by the state of Minnesota. The returns of deaths for 1910 do not show any great difference in the number of reports received. It would appear therefore that the returns of deaths prior to that date were probably reasonably complete. Prior to 1907 it was assumed that all returns of births and deaths were to be used purely for statistical purposes in the office of the State Board of Health, as the law required that soon after the close of the year the original returns were to be sent back to the clerk of the district court of each county in the state, but this law was revised in 1907 so that now the original returns of births and deaths are kept in the office of the State Board of Health. Minnesota is not yet a registration state for births although an effort is being made to secure more complete returns of births. The cause of the present condition is due to the neglect of certain individuals to make reports, rather than to any defect in the law. In February, 1912, a special agent was secured by the Board to investigate the various registration districts and to prosecute those who had been negligent in making returns of births and deaths. The effect of this work has done much to improve the conditions and it is to be hoped that in the near future Minnesota will be a registration state for births as well as for deaths.

The Division of Epidemiology was created in April, 1910, and Dr. H. W. Hill was placed in charge as director. In August, 1912, Dr. Hill resigned, to assume the position of director of the Institute of Public Health, London, Ontario. He was succeeded by Dr. A. J. Chesley. Since the creation of this Division of Epidemiology, it has been possible for the Board to give a greater amount of aid to local boards of health and greater efficiency has been secured in this way in the control of communicable diseases. There is great opportunity for further development along these lines. To carry out this work effectively, however, there should be whole-time health officers in the larger municipalities with their authority extending over the surrounding territory, in such a way as to cover the entire state with efficient sanitary supervision.

The work of the Laboratory Division has not changed materially from that of prior years except in the matter of developing certain lines of work and the addition of a branch laboratory at Mankato. This latter was made possible through the action of the physicians of that city, they guaranteeing to pay three-fifths of the salary of the whole-time man, and the state paying two-fifths. Soon after this position was created the city of Mankato made the one selected for this position, Dr. C. C. Pratt, health commissioner of the city, thus further centralizing the public health work.

The engineering work of the Board is so far purely voluntary, except in the examination of plans for school buildings in their relation to sanitary problems, this responsibility having been placed upon the State Board of Health. The state is doing much advisory work on water and sewerage systems, but this is purely of a voluntary nature, as there is no law requiring the Board to give such advice, nor has it any authority over such systems in advance of their construction although after their construction it has a responsibility in respect to their conditions. Various attempts have been made to secure a satisfactory law relating to the engineering work in connection with such systems but so far only failure has resulted.

In 1911 the Board felt that much good could be accomplished along health lines by carrying on a preliminary educational campaign in relation to school hygiene, and to accomplish this purpose it availed itself of an opportunity to secure Dr. Ernest Bryant Hoag, lecturer in Public hygiene at the University of California, for one year's service in Minnesota. Dr. Hoag began his work August 1, 1912, being given the title of special director of school hygiene. A circular in form as follows was sent to the superintendent of schools in certain of the larger municipalities:

"The State Board of Health and the Department of Public Instruction of Minnesota wish to lend their aid to the schools of the state in promoting health supervision of school children. To this end, the State Board of Health has engaged the services of Dr. Ernest B. Hoag, formerly of the University of California, to help Minnesota towns and cities to organize health work in schools.

"Dr. Hoag will travel about the state, spending from one day to two weeks, as may be required, in the various places needing his services.

"It is proposed to demonstrate to towns, cities and counties, that rational conservation of the mental and physical health of our school children is possible and practical with the means already at hand. Three plans will be proposed:

(1) Organization with a medical officer and nurse or nurses.
(2) Organization with school nurse or nurses only.
(3) Organization by the employment of a simple non-medical **Health Survey** on the part of the teachers only. Such a survey is provided by a series of questions based upon ordinary observation of physical and mental conditions. The outline for this purpose will be furnished by the State Board of Health—one for each child. No community need wait for the employment of a medical officer in order to begin sensible health observation of school children.

"Dr. Hoag will be available for lectures on Child Hygiene, Medical Supervision, and related topics, for clubs, institutes, and various other organizations. The State Board of Health will maintain in its office in the Capitol building, St. Paul, a clearing house of information concerning child hygiene, medical supervision, the teaching of school hygiene, sex hygiene and the like. Please make full use of the opportunities furnished in this new work. Your co-operation is earnestly desired."

In each instance there came a response in the form of a request that Dr. Hoag be sent to them. As a result of this Dr. Hoag was scheduled to visit as many of these places as possible.

His work was somewhat as follows: The superintendent of schools was advised in advance of his visit to any municipality. Dr. Hoag would first meet with the superintendent on his arrival, then with the teachers, taking up with them the question of child hygiene and later would have a demonstration for the benefit of the teachers, picking out certain defective children and instructing the teachers in the methods of detecting these defects. Finally, if desired, a public address was given in the municipality as a means of instructing the people in the needs of more attention to child hygiene.

The object of this work in schools is to show teachers how easy it is to detect the ordinary physical handicaps from which children suffer. Any teacher after a little instruction in the matter can readily learn how to discover these handicaps of the defective child. These defects are very much the same among all school children and the proportion is practically the same everywhere. Teachers should be able not only to recognize sick children among those under their charge but also to find a very considerable number of children who have physical or mental defects which interfere with their school progress. These defects should be discovered and corrected.

As a matter of fact, about twenty-five per cent of school children have visual defects of one kind or another. These can ordinarily be discovered by the use of the test-type card but a very considerable number of these defects may be brought to light by a very simple question put to the children as to the appearance of the print in their books.

Teachers should also be able to discover a large percentage of those children suffering from adenoids, enlarged tonsils and defective hearing. Still further, they should be able to detect the child of subnormal mentality.

It is important that all of these handicaps should be discovered early if children thus affected are to receive a reasonably fair opportunity in life and at the same time not act as a drag on the normal children associated with them in their studies.

It was possible to secure Dr. Hoag only because of a surplus that had accumulated in one of the funds of the Board through a process of economy. It is to be hoped that the coming legislature will sufficiently appreciate this preventive work to provide an appropriation for its continuance, as it certainly is coming to be recognized as one of the most important functions of public health.

SPECIAL TUBERCULOSIS WORK.

In the fall of 1907 a traveling tuberculosis exhibit was organized to be used as a part of the educational campaign against tuberculosis. Early in 1908 the exhibit was started on the road, since which time it has been seen in some one hundred and sixty cities and villages in the state, visiting practically all of the cities and villages having a population of one thousand or upwards and many smaller places.

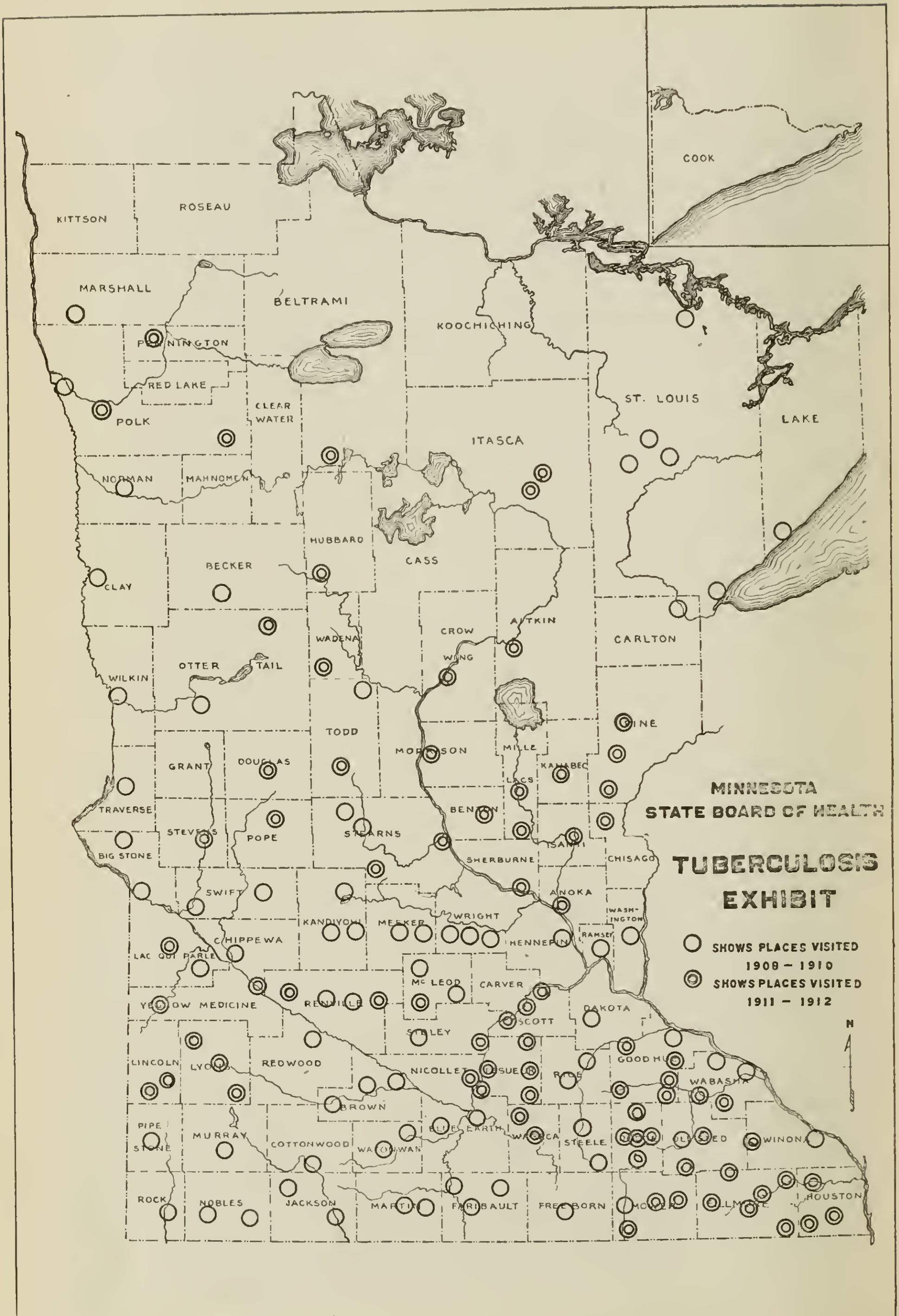
During the biennial period 1911-12 the cities and villages visited were as follows:

Belle Plaine.
Brownton.
Buffalo Lake.
Caledonia.
Cambridge.
Canby.
Cannon Falls.
Chatfield.
Claremont.
Coleraine.
Dexter.
Dodge Center.
Elgin.
Eyota.
Foley.
Glenwood.
Goodhue.
Grand Meadow.
Grand Rapids.
Granite Falls.
Hayfield.
Henderson.
Hinckley.
Houston.
Janesville.
Jordan.
Kasota.
Kasson.
Kenyon.
Lake Benton.
Lanesboro.
Le Sueur.
Lyle.
Little Falls.
Mabel.
Madison.
Marshall.
Milaca.
Minneota.
Montgomery.
Mora.
Morris.
New Prague.
Paynesville.
Pine City.
Pine Island.
Plainview.
Preston.
Princeton.
Rush City.
Rushford.
St. Charles.
St. Peter.
Sacred Heart.
Sandstone.
Shakopee.
Spring Grove.
Spring Valley.
Stewartville.
Tracy.
Tyler.
Waseca.
Waterville.
West Concord.
Zumbrota.

The total attendance at the seventy-four places was approximately fifty thousand.

In addition to the above named places the exhibit has been shown at the state fairs of 1911 and 1912 and the county fairs at Mankato, Tyler and Madison in 1912, where it aroused considerable interest.

The results of this educational campaign are very plainly to be seen this fall in the strong demand for legislation looking to the establishment of tuberculosis sanatoria. During the fall a representative of the State Board of Health and the State Tuberculosis Association made a tour of the state in an effort to arouse interest in the legislation proposed by the state tuberculosis commission appointed by the governor. This commission was requested to study into the needs of the state in its effort to control tuberculosis and to make recommendations to the legislature. The State Board of Health, believing that the next step in the anti-tuberculosis campaign should be in the direction of securing institutions for the isolation of those who are spreading the disease, is lending its hearty co-operation, in the hope that the above mentioned legislation may be enacted into law.



DRAWN BY THE ENGINEERING DIVISION – STATE BOARD OF HEALTH

VITAL STATISTICS.

BIRTH REPORTS.

Minnesota is not yet in the registration group of states for births. Although birth returns have been received since 1887 they are more or less incomplete. No attempt was made to classify these until 1911. Births are reported in the following tables:

Total births for counties by months for 1910-11, Tables I and XXVII.

MORBIDITY REPORTS.

The diseases reported for the calendar years 1910 and 1911 are as follows:

Tuberculosis, Tables II and XXVIII.
Typhoid fever, Tables III and XXIX.
Diphtheria, Tables IV and XXX.
Scarlet fever, Tables V and XXXI.
Measles (1911 only), Table XXXII.
Smallpox, Tables VI and XXXIII.
Epidemic anterior poliomyelitis, Tables VII and XXXIV.
Epidemic cerebro-spinal meningitis (1911 only), Table XXXV.

MORTALITY RECORDS.

The deaths for the calendar years 1910 and 1911 are as follows:

Total deaths from all causes classified by counties, Tables VIII and XXXVI.

Tuberculosis:
  a. Pulmonary, Tables IX and XXXVII.
  b. Non-pulmonary, Tables X and XXXVIII.
Pneumonia:
  a. Broncho, Tables XI and XXXIX.
  b. Lobar, Tables XII and XL.
Bronchitis:
  a. Acute, Tables XIII and XLI.
  b. Chronic, Tables XIV and XLII.
Cancer, Tables XV and XLIII.
Diarrheal diseases of children.
  a. Under two years, Tables XVI and XLIV.
  b. Two to five years, Tables XVII and XLV.
Typhoid fever, Tables XVIII and XLVI.
Diphtheria, Tables XIX and XLVII.
Scarlet fever, Tables XX and XLVIII.
Measles, Tables XXI and XLIX.
Whooping cough, Tables XXII and L.
Smallpox, Tables XXIII and LI.
Epidemic anterior poliomyelitis, Tables XXIV and LII.
Epidemic cerebro-spinal meningitis, Tables XXV and LIII
Puerperal sepsis, Tables XXVI and LIV.

TABLE I

BIRTHS REPORTED FOR 1910

COUNTIES	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Aitkin	24	22	18	32	18	17	27	18	17	22	21	17	253
Anoka	16	18	18	18	15	18	13	20	18	20	18	9	201
Becker	37	32	36	38	53	34	49	50	39	53	29	30	480
Beltrami	36	36	39	49	32	32	38	32	48	34	32	25	433
Benton	29	27	32	28	28	26	18	29	23	20	24	15	299
Big Stone	19	15	17	16	20	19	17	18	19	22	13	15	210
Blue Earth	64	17	46	49	45	30	49	54	55	46	42	41	568
Brown	45	45	50	31	41	43	52	49	37	44	45	19	501
Carlton	46	30	46	41	37	32	58	40	27	32	42	30	461
Carver	43	27	40	40	33	16	27	21	30	20	29	33	359
Cass	26	28	15	13	20	17	16	7	13	17	12	6	190
Chippewa	21	23	28	23	28	26	25	25	27	29	26	16	297
Chisago	20	23	22	26	21	23	27	29	26	24	21	18	280
Clay	31	34	40	28	44	40	23	44	45	29	24	18	400
Clearwater	20	13	18	18	14	21	15	14	13	17	16	26	205
Cook	2	3		....		1	2	1	3	1	2	1	16
Cottonwood	32	14	16	34	28	31	20	24	28	24	14	17	282
Crow Wing	30	34	27	33	48	30	35	39	32	32	20	27	387
Dakota	36	27	40	49	36	45	42	44	36	45	22	39	461
Dodge	27	18	17	15	14	16	26	28	21	20	20	11	233
Douglas	31	26	45	33	35	21	33	26	27	28	27	28	360
Faribault	34	19	49	34	37	30	31	29	25	35	25	15	363
Fillmore	32	33	38	42	36	43	44	30	38	41	31	31	439
Freeborn	36	26	43	32	30	33	44	34	33	40	40	28	419
Goodhue	45	42	56	64	49	43	52	42	49	50	40	44	576
Grant	13	24	15	14	18	16	18	19	20	15	7	19	198
Hennepin	569	491	564	541	501	522	587	599	581	547	490	530	6,522
Houston	11	14	32	28	25	18	21	32	33	18	20	12	264
Hubbard	28	18	23	20	26	23	15	11	14	12	13	14	217
Isanti	34	24	21	25	29	25	27	25	29	36	29	17	321
Itasca	32	35	22	38	37	33	32	37	34	34	34	28	396
Jackson	32	18	30	39	31	18	32	25	26	35	26	26	338
Kanabec	11	17	13	14	10	11	10	9	16	17	10	6	144
Kandiyohi	35	32	27	27	36	25	40	37	34	36	34	35	398
Kittson	23	19	29	17	21	19	17	25	21	24	17	12	244
Koochiching	15	1	11	8	10	10	9	11	10	9	9	2	105
Lac qui Parle	28	35	26	33	45	29	35	43	43	40	35	30	422
Lake	15	10	10	20	13	10	6	13	21	16	10	11	155
Le Sueur	29	26	37	35	31	31	32	31	26	35	28	31	372
Lincoln	16	19	15	19	13	15	24	16	21	21	14	18	211
Lyon	36	26	33	27	43	32	31	32	34	39	32	27	392
McLeod	34	23	32	37	29	27	47	41	36	29	21	27	383
Mahnomen	7	5	5	9	3	5	2	6	5	6	1	4	58
Marshall	44	38	33	36	26	30	31	39	26	33	28	25	389
Martin	28	47	39	28	36	23	38	29	34	31	34	21	388
Meeker	37	23	36	23	20	26	24	23	37	30	24	21	324
Mille Lacs	13	21	20	18	12	18	13	12	21	15	18	22	203
Morrison	46	49	44	46	45	36	62	54	52	40	37	39	550
Mower	37	31	43	27	28	31	30	40	42	42	38	32	421
Murray	21	19	23	37	21	17	19	29	26	28	16	19	275
Nicollet	23	24	24	26	26	18	26	28	27	26	29	21	298
Nobles	36	31	34	29	29	34	32	46	35	31	30	27	394
Norman	25	25	28	23	28	22	17	33	26	35	22	21	305
Olmsted	31	28	40	34	37	33	34	38	21	23	23	28	370
Otter Tail	73	88	110	76	80	86	102	95	84	88	80	70	1,032
Pine	40	19	24	38	27	23	25	36	31	26	22	32	343
Pipestone	18	23	26	20	16	17	10	14	12	17	21	16	210
Polk	69	67	54	59	59	47	60	81	71	63	69	52	751
Pope	23	20	19	20	27	19	32	21	31	24	24	23	283
Ramsey	394	332	387	272	338	364	401	384	338	298	325	315	4,148
Red Lake	40	34	46	44	41	30	24	30	36	30	31	27	413
Redwood	39	42	27	42	39	43	22	47	44	35	46	34	460
Renville	47	41	49	53	40	33	40	35	48	45	34	39	504
Rice	39	29	37	44	35	32	28	32	24	37	36	34	407
Rock	19	21	28	20	19	26	19	31	30	15	27	18	273
Roseau	31	23	34	22	30	19	22	32	32	16	23	14	298
St. Louis	372	350	315	378	385	326	444	418	391	373	405	396	4,553
Scott	16	20	27	13	27	23	23	28	28	21	22	17	265
Sherburne	14	14	12	12	17	11	17	8	11	8	17	17	158
Sibley	31	25	23	33	33	39	23	30	34	34	15	32	352
Stearns	103	95	101	103	92	106	118	113	107	93	84	69	1,184
Steele	30	26	32	39	28	32	29	27	30	15	28	27	343
Stevens	13	8	12	13	7	13	12	18	13	17	22	10	158
Swift	31	18	33	25	23	25	37	31	17	19	25	25	309

TABLE No. I—Continued

BIRTHS REPORTED FOR 1910

COUNTIES	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Todd........	44	53	46	44	49	27	53	57	54	54	50	43	574
Traverse.....	6	18	22	20	16	12	12	24	13	15	21	14	193
Wabasha.....	29	22	39	46	36	29	42	30	31	24	21	36	385
Wadena......	18	23	20	26	25	18	24	23	15	30	17	19	258
Waseca.....	22	24	12	22	26	16	20	25	23	26	13	24	253
Washington...	20	39	27	35	27	26	38	25	38	28	29	38	370
Watonwan....	27	18	26	18	23	18	9	18	18	21	21	16	233
Wilkin.......	14	20	23	16	21	18	15	18	12	19	10	14	200
Winona......	61	60	65	50	63	46	62	71	49	57	62	64	710
Wright.......	49	44	47	53	41	47	40	39	45	45	44	44	538
Yel. Medicine.	30	21	30	37	23	41	28	41	25	23	19	37	355
Totals...	3,853	3,472	3,858	3,757	3,704	3,456	3,925	4,012	3,815	3,664	3,427	3,300	44,243

TABLE II—

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	7	2	5		2		1		1				1	1	1
Becker	6	2	4	2		1				1			2		
Beltrami	1	1							1						
Benton	1		1				1								
Blue Earth	2	1	1							1	1				
Brown	11	4	7		2	3	2		1	1			1		1
Carlton	11	5	6			1		1			2	2	3	2	
Carver	1		1											1	
Cass	211	107	104		5	15	26	9	15	52	20	17	29		23
Chisago	3	3		1	1										1
Clay	4	1	3					1		1			1	1	
Clearwater	1	1							1						
Cottonwood	5	3	2		1		1			1	1		1		
Crow Wing	4	3	1				1	1	1					1	
Dakota	5	2	3			1				1					3
Dodge	2	2									1			1	
Douglas	3	2	1					2						1	
Faribault	7	3	4		2		1	1	1		1		1		
Fillmore	9	5	4			3	1	1	1		1		1	1	
Freeborn	4		4				1			1	1				1
Goodhue	3	1	2				1		2						
Grant	1		1			1									
Hennepin	11	8	3	3		1	1		2	1	1		2		
Isanti	9	6	3	1	1		1	2	1	1	1				1
Itasca	3	3			1					1					1
Jackson	2	1	1										1		1
Kanabec	1		1										1		
Kandiyohi	1	1											1		
Kittson	2	1	1								1	1			
Koochiching	2	1	1	1					1						
Lac qui Parle	2	1	1				1		1						
Lake	1		1			1									
Le Sueur	3	2	1				1				1		1		
Lincoln	1	1												1	
McLeod	1	1			1										
Mahnomen	7	4	3	1	2					1			1		2
Martin	1	1													1
Meeker	6	6		1		2	2			1					
Mille Lacs	2		2			1			1						
Morrison	2		2										2		
Mower	10	3	7	1	1			1	1		3		2	1	
Murray	2		2										1	1	
Nicollet	19	7	12		5	2	5	1	4		1				1
Nobles	2	1	1											2	
Norman	3	1	2					1					2		
Olmsted	32	1	31	28	2						1	1			
Otter Tail	8	5	3	2	1	**2**		1			1			1	
Pennington	1		1											1	
Pine	5	3	2			1		2					1	1	
Pipestone	1	1												1	
Polk	8	3	5	1	2	2					1		2		
Pope	2	1	1		1		1								
Ramsey	1		1		1										
Red Lake	4	3	1				1	1	1		1				
Redwood	1		1											1	
Renville	3	2	1					1	1	1					
Rice	7	5	2	1		3							2		1
Polk	6	4	2	1			2			1	1		1		
Roseau	9	4	5	2	1		2	1		1	1	1			
St. Louis	117	74	43	11	13	8	10	9	17	11	8	7	6	7	10
Scott	2		2									2			
Sherburne	4	3	1		1						2	1			
Sibley	8	4	4	1	1	1	3			1					1
Stearns	16	6	10			5		1	2	4		3	1		
Steele	2		2								1				1
Swift	1		1			1									
Todd	7	4	3		2	1			1		1	1		1	
Wabasha	4	3	1	1					2						1
Wadena	6	3	3	1		1	1	1		1			1		
Washington	12	8	4		1	1		1	4	2		1		2	
Winona	7	2	5	1	1						2			2	1
Wright	10	5	5	1		1	4	1		1		1	1		
Yellow Med.	6	3	3			1		1	2	2					
Total	685	344	341	62	51	60	71	41	65	89	99	38	69	31	52

TUBERCULOSIS

FOR 1910

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	known
				1	1		2			1	1			1		
					2	1		1	1					1		
																1
					1											
								1			1					
					3	4	1	2		1						
					1	4	1	2	2		1					
									1							
			1	24	60	53	25	20	16	7	2					3
							1	1		1						
				1		1	1	1								
						1										
				1	1	1	1		1							
							1	1		2						
				1		1		1		1				1		
					1					1						
				2	1											
				1	1	2				1			1			1
				1		1	1	1	1	1	1			2		
							1	1	1	1						
							1	1			1					
						1										
					3	3		2		1		2				
				1	1	3	1	2	1							
					1		1						1			
					1					1						
									1							
																1
							1									1
							1		1							
				1							1					
								1								
						1		1				1				
									1							
							1									
				3	1	1			1	1						
						1										
					4			1								1
					1	1										
					1	1										
				2	1	2		2		1	1		1			
				1		1										
					4	2	1	4	4	1	1			1		1
								1	1							
				1	2											
				1	1	3	4	6	3	3	3	3	2	1		2
			1		1		2	2						1	1	
					1											
	1					2	1				1					
					1											
					3	3		1				1				
						1										1
					1											
					1			2	1							
					1											
						1	1			1						
				2	2		1	1								1
					1	2	1							1		1
				1	3	3	1									1
			4	1	24	16	14	12	10	5	5	5	1	1		19
			1				1									
							2					1	1			
				2	3		1				1					1
				1	3	2	2	3	2	1	1					1
				1				1								
					1											
					2	2	1			1	1					
						2			1	1						
					2	1		1	1	1						
				2	2	3		1		2			1			1
					1	2	1	1			1					1
				3	1	3		1	1		1					
				1	1	1	1	1	1							
......	1	.....	7	56	148	133	76	80	53	37	24	13	8	10	1	38

TABLE II—

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.
CITIES over 5000 population															
State Sanat'm	211	107	104	.....	5	15	26	9	15	52	20	17	29	.....	23
Minneapolis..	3	3	.....	1	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....
Little Falls...	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Austin.......	6	2	4	1	.....	.....	.....	.....	1	.....	2	.....	1	1	.....
Rochester....	32	1	31	28	2	.....	.....	.....	.....	.....	1	1	.....	.....	.....
Faribault.....	2	1	1	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Duluth......	90	59	31	8	9	6	7	6	14	9	5	4	6	7	9
St. Cloud....	4	.....	4	.....	.....	1	.....	.....	.....	2	.....	1	.....	.....	.....
Owatonna....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Stillwater....	12	8	4	.....	1	1	.....	1	4	2	.....	1	.....	2	.....

TUBERCULOSIS—Continued

FOR 1910

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
......	.....	.....	1	24	60	53	25	20	16	7	2	.....	.....	.....	.....	3
......	.....	.....	.....	.....	1	.....	.....	1	.....	.....	....	1	.....	.....	....	.....
......	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
......	.....	.....	.....	2	1	2	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
......	.....	.....	.....	1	1	3	4	6	3	3	3	3	2	1	.....	2
......	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
......	.....	.....	3	1	18	12	9	8	8	5	4	5	1	1	.....	15
......	.....	.....	.....	.....	2	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....
......	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
......	.....	.....	.....	2	2	3	.....	1	.....	2	.....	.....	1	.....	....	1

TABLE III—TYPHOID CASES REPORTED

COUNTY	Total	Male	Female	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	10	4	6	5	1							2		1	1
Anoka	16	13	3	2	1							8	2	1	1
Beeker	9	6	3		2							3	4		
Beltrami	39	22	17							1	1	5	23	6	3
Blue Earth	32	21	11	1		1	2	3	2	2	4	4	9		4
Carlton	26	17	9								9	8	9		
Carver	1	1												1	
Cass	1	1							1						
Chippewa	3	2	1							1		1	1		
Chisago	9	8	1	2				1		2		2	1		1
Clearwater	1		1										1		
Cottonwood	8	6	2		1					2	3		2		
Crow Wing	36	24	12	25						1	2	8			
Dakota	5	1	4	2	1	1						1			
Dodge	1		1								1				
Douglas	6	5	1						1	2	1		2		
Faribault	3	1	2								1	1	1		
Fillmore	5	3	2		1						2	1		1	
Freeborn	5	2	3		1							1	1	2	
Goodhue	31	16	15	6	2	2	6				1	2	4	4	4
Grant	4	4											2	2	
Hennepin	554	347	207	76	106	79	23	18	17	26	82	45	45	31	6
Hubbard	4	4					1	1						2	
Isanti	3	3		1										1	1
Itasca	126	84	42	1			1		8	11	35	37	19	11	3
Jackson	1		1								1				
Kanabec	6	3	3								1	1	2		2
Kandiyohi	4	4									2		1	1	
Kittson	8	5	3			1		1		1	2	3			
Koochiching	12	10	2	1	1						8	2			
Lac qui Parle	11	5	6	2	2		1		1	2		1	1	1	
Lake	21	9	12	4		4	11	2							
Lyon	3	2	1									3			
McLeod	8	5	3		1						2	3	1		1
Mahnomen	6	2	4									1		5	
Marshall	24	16	8		2	1		1		2	1	8	5	4	
Meeker	1	1											1		
Mille Lacs	4	2	2							2				2	
Morrison	24	17	7		8	7	3						2		4
Mower	14	10	4	1							1	2	3	6	1
Nicollet	83	48	35	5	1	1		1	1	5	8	24	29	4	4
Nobles	9	5	4	2	2					2			3		
Norman	1	1												1	
Olmsted	13	9	4	1		1	1			3	1		3	2	1
Otter Tail	73	56	17	3	1			1	1	2	9	37	12	7	
Pine	11	7	4					1		1	2	5	1		1
Pipestone	4	3	1									1	1	1	1
Polk	31	10	21	1	1	2	2	1	1	1	7	2	1	8	4
Pope	1	1											1		
Ramsey	22	14	8							2	10	1	7	2	
Red Lake	3	2	1				1					1	1		
Redwood	10	8	2	2							2	3		3	
Renville	5	3	2					1				2	1	1	
Rice	25	14	11	1				2	3	2	5	6	2	3	1
Rock	14	8	6			1					6	7			
Roseau	16	9	7	1							1	1	2	4	7
St. Louis	427	331	96	13	7	4	4	6	2	16	111	144	86	23	11
Scott	11	6	5		1	1				2		4	3		
Sherburne	7	4	3								2	3	2		
Sibley	5	3	2				2				1			2	
Stearns	16	9	7				1	2		1	2	3	7		
Steele	15	12	3	1	5	1	1	1				1	1	2	2
Stevens	2	1	1		1			1							
Swift	1	1												1	
Todd	6	2	4			1				1		2	2		
Wabasha	12	10	2	1							3	5	2		1
Wadena	3	3											2	1	
Waseca	1		1											1	
Washington	20	14	6		1			1		1	2	4	7	3	1
Watonwan	8	5	3					1			1	3		1	2
Wilkin	11	5	6		1								6	2	2
Winona	7	6	1		1					1	1		2	2	
Wright	24	16	8	10	4	2	2			1	1	1		1	2
Yellow Med	3	3							1				2		
Total	1985	1315	670	170	156	110	62	46	39	96	335	413	328	158	72

FEVER
FOR 1910

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
				3	3	1	1				1	1				
1				1	6	2	1	1	2	1				1		
1			2	1	3			1				1				
	3	5	2	5	4	4	7	3	3	2		1				
		3	5	5	7	5	4	2	1							
1		5	3	2	3	4	3	2		1	2					
					1											
									1							
			1			1			1							
		1		1	3	2					2					
				1												
		3	2					2								1
1	2	4	9	1	4	4	4	2	4			1				
			1	2		2										
			1													
			1	2	1	1				1						
		1		1		1										
			1		1	1		1	1							
			1	1	1	1										1
1	1	2	2		8	4	2	3	4		1			1		2
					1			1			1					1
3	25	36	27	49	109	109	71	29	27	11	14	6		1		37
					3				1							
			1	1				1								
	1	20	10	14	20	23	22	7	5	2		2				
						1										
			1	1	1	1	1		1							
				1	1					2						
		1	1	1			2			1						2
				1	5	2	1	2		1						
				3	3	2	1			1						1
		8	3	4	2	2	1	1								
			2	1												
		2	1		3	1				1						
		4	1					1								
		2	5	5	3	1		3		1	1	1		1		1
						1										
					1	2				1						
	2	5	2	1	7	2	4			1						
	2	2	3	1	3		1					1		1		
				8	13	13	11	9	6	12	6		2			3
			1		3		2	2								1
										1						
				1	2	1	1	1		1	3		1			2
	2	4	6	6	12	11	10	6	1	6		2				4
		1	3	1		2		1	2							1
			1	1	1	1										
		2	7	4	6	2	3	2		4	1					
													1			
	1	2	2	3	2	2	2	3			1					4
							2	1								
			2		2	2	2						1			1
		2	1		2											
	4	2	1	6	2	4	4	1								1
		4	1	1	2	1	2	1		1		1				
		3	5	3	1	2	1				1					
1	13	27	23	31	96	81	47	21	5	6	3	1		1	1	70
		1		2	3	1	3		1							
		2	2	1			1									1
		1		1	2	1										
			1	4	5	2	2		1	1						
		3		2	2	3	2	1			1					1
		1		1												
					1											
				1	1	2				1		1				
		2	1		1	1	1	2								1
			1			1			1							
				1												
	1	1	1	5	4	1	2		2	1						1
		1		1		2	1		1		2					
	1	1	1	2	3	1		1		1						
		1	1		1	2			1							1
		2	1	8	5	3	2			2						1
					1		2									
9	58	167	149	203	381	327	230	111	71	65	40	19	5	6	1	110

TABLE III—

CASES REPORTED

COUNTY	Total	Male	Female	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.
CITIES over 5000 population															
Mankato	23	15	8	1	......	1	2	3	2	2	4	3	2	......	3
Cloquet	21	14	7	......	......	......	......	......	......	......	8	6	7	......	......
Brainerd	1	1	......	......	......	......	......	......	......	1	......	......	......	......	......
Red Wing	17	7	10	5	1	2	4	......	......	......	1	1	1	2	......
Minneapolis	531	328	203	76	104	79	23	18	16	26	68	44	44	29	4
Little Falls	18	14	4	......	7	7	3	......	......	......	......	......	1	......	......
Austin	5	3	2	......	1	......	......	......	......	......	2	1	1	......	......
Rochester	8	5	3	......	......	1	1	......	......	3	1	......	2	......	......
Crookston	9	2	7	......	......	......	1	1	......	1	5	1	......	......	......
St. Paul	8	5	3	......	......	......	......	......	......	1	5	......	2	......	......
Faribault	19	11	8	1	......	......	......	1	3	2	3	5	2	2	......
Biwabik	49	38	11	1	4	2	......	......	......	......	10	14	12	3	3
Eveleth	51	44	7	4	3	......	2	1	......	......	8	6	19	4	4
Hibbing	200	157	43	......	......	1	......	4	2	14	66	73	31	5	4
Virginia	106	80	26	8	......	1	......	......	......	......	23	47	22	5	......
St. Cloud	11	9	2	......	......	......	......	......	......	......	1	3	7	......	......
Owatonna	5	4	1	......	......	......	1	1	......	......	......	1	......	2	......
Stillwater	10	6	4	......	1	......	......	......	......	1	1	1	5	1	......
Winona	7	6	1	......	1	......	......	......	......	1	1	......	2	2	......

TYPHOID FEVER—Continued

FOR 1910

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
....	..	3	4	3	5	2	3	2	1							
1		1	2	2	3	4	3	..			2			....	....	....
......		1				..	.....	.....						....	....	......
......			1		7	2	1	3	2	.	1	..		....	....	......
3	24	34	26	48	107	102	69	27	27	10	13	6	....	1	.....	34
......	2	5	2	1	4	1	2	.	.	1				.....	.....	....
......		1	...			2	..	1	1			....	.....	.....	.....	.....
......	.....		...		1	.	1	1	..	.	1	....	1	.....	.....	2
......	...		3		2		..	.		3	1			.....	.....	......
......		1	..	1	1	1	1	1		...		.....	......	.....	.....	2
......	3	2	1	5	1	2	3	1	.	...		. .	......	.....	.....	1
1	3	4	3	6	14	6	6	4	1	...			...	1	......	......
......	2	2	4	5	15	13	6	2	..	....		1	......	......	...	1
......	4	16	11	17	63	47	20	11	1	5	2	...	......	......	1	2
......	2	2	2	1	3	14	9	3	2	1	1		..	...	....	66
......	..		1	3	2	2	1	...	1	1	..		.....	...	...	......
......			.	.		2	1	1		.	1	.	....	....	.....	....
....	1		1	3	2	..	1	...	1	1	.		..	...	...	....
......	.....	1	1....		1	2		.....	1	....	.	...	...	.....	....	1

TABLE IV—DIPHTH

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	13	6	7						7	5	1				
Anoka	9	6	3	2	1			1	1	1		3			
Becker	23	7	16	7	2	1	1	3	1	6	1			1	
Beltrami	30	21	9	7	6	1	6	3	4	1				1	1
Benton	22	13	9		4	1		2	3	2	2			5	3
Big Stone	5	4	1				2	2		1					
Blue Earth	28	17	11	2	1	4	2	1	2	1	7	2	4	2	
Brown	12	8	4					1	9		2				
Carlton	29	8	21			1					1	10	7	7	3
Carver	46	18	28	6		4	7	4	1	4	2	6	1	5	6
Cass	15	7	8	1	1	1					1	1	7	3	
Chippewa	19	8	11	2	2			1	1	3	2		2	4	2
Chisago	10	3	7	2	1	4			1	1			1		
Clay	21	10	11	1	3	2	2	5	6		1		1		
Clearwater	13	8	5					4	4	2		2	1		
Cottonwood	33	16	17	1					2	1		1	12	9	7
Crow Wing	53	26	27	2		3	5	4	6	14	6	6	4	1	2
Dakota	105	60	45	2	2	5	8	3	9	4	17	34	10	4	7
Dodge	10	4	6	2		1	2	1		3	1				
Douglas	8	3	5	2	2			1		3					
Faribault	30	12	18	2	3	3	2	8	3	5		1		3	
Fillmore	38	15	23	1		3	9	3	15		1	1		2	3
Freeborn	37	11	26	3	3	4	2	5	14	4			1		1
Goodhue	32	17	15	2	2		9	1	1	6	2	6	1		2
Grant	10	6	4	8				1		1					
Hennepin	68	32	36	7	8	11	4	8	1	2	8	3	3	8	5
Houston	6	2	4			1						1	3	1	
Hubbard	4	1	3		1						1	2			
Isanti	3	1	2			2		1							
Itasca	25	10	15	4	3	6	2	1			5	2		2	
Jackson	16	8	8					2	8	3			1	1	1
Kandiyohi	33	17	16	2	3	10	3	2	1	5	2	2	1	2	
Kittson	7	2	5				3		4						
Koochiching	3	1	2	1				1					1		
Lac qui Parle	25	11	14	1	4	12	3	1			2	2			
Lake	35	19	16	7	9	8		1				1	9		
Le Sueur	34	19	15	6	5	1	1	9	4	2	2	1		2	1
Lincoln	2	2												2	
Lyon	10	6	4						10						
Mc Leod	16	5	11	2	2	2	4	1	3	1					1
Mahnomen	1	1										1			
Marshall	24	7	17	2	7	1		1	1	3	3	6			
Martin	12	3	9	2				1		7			2		
Meeker	22	5	17	3	1	8	3	2				1	2	2	
Mille Lacs	21	10	11	5	1	2	1	4		1	4	1	1		1
Morrison	65	33	32	6		2		6	3		14	7	18		9
Mower	50	26	24		8	8	7	18	3	2	1	1	2		
Murray	4		4	1	1		1						1		
Nicollet	19	10	9	2	2	4	2				2		2	3	2
Nobles	61	21	40	1		3	3	4	1	2	1	13	14	14	5
Norman	4	3	1							3					1
Olmsted	45	10	35	1			2	15	10	5	1		1	2	8
Otter Tail	65	26	39	3	4	4	6	1	3	9	4	6	5	4	16
Pine	5	4	1				1		2		1				1
Polk	29	18	11	3	4	2	1	5	3	5	1	3		2	
Pope	10	5	5	1				1	1	2			5		
Ramsey	41	23	18	3	4	1	2	12	10		1	2	3	1	2
Red Lake	19	8	11	3			1	3	1	4	3	3	1		
Redwood	7	2	5	1			1		2	2	1				
Renville	10	3	7	1	1		1	1	1				4		1
Rice	49	25	24	5	9	6	8		4		2	1	4	6	4
Rock	4	1	3	3								1			
Roseau	14	9	5			2				3				7	2
St. Louis	124	57	67	19	19	3	4	10	5	14	15	21		9	5
Scott	24	13	11	1	1		8	1	2	5	1		4		1
Sherburne	24	10	14		2		5	3		2		6	1	1	4
Sibley	17	8	9	2	1		2	1					4	3	4
Stearns	62	29	33	15	14	3	3	3	1	1		5	2	4	11
Steele	18	9	9	8	1	1	2			1		1		2	2
Swift	19	10	9	2				3	5	4	2	2	1		
Todd	8	4	4						7	1					

ERIA

FOR 1910

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
		4	3	4	1	1										
		5			1		1					1				1
	4	1	5	6	2	1	1	1		1			1			
	4	6	3	4	5	1	6		1							
	6	3	7	3	1			1	1							
	1	2	2													
	4	6	4	7	2	2			1		1		1			
	2	5	1	3					1							
1	7	6	8	4	1		1	1								
	7	13	13	7	2		3			1						
	1		5	1	4		2			1		1				
		4	7	2	3	2	1									
	2	1	2	1	3		1									
	3	5	5	4	1	1			1							1
1		2	2	5	4	1		1								
	2	10	6	5	3	4			1	2						
	5	16	8	13	5	2	2	2								
1	21	28	22	13	8	4	2	1	1							4
	1	4	2	1			1	1								
		3			2				1	1						1
	3	7	8	6	2		3		1							
1	5	4	9	7	4	1	1	2	1	1					1	1
	1	10	11	7	2	1		1	3		1					
	5	7	8	8	1	2					1					
	1	1	4			1	1			2						
	5	11	10	11	6	10	4	2	1	2	1	2				3
		2	3		1											
		3		1												
1	1	1														
	6	5	3	2	2	4	3									
	2	5	4	1		1			2	1						
2	4	7	7	4	4	1	1			1						2
	1	2	1	2	1											
					1		1	1								
	6	6	5	4	1			1	1		1					
	7	7	7	5	5	1		1	1		1					
	7	12	5	1	3		4	1								1
		1	1													
		2	3	3					2							
	2	6	1	1	4		1		1							
						1										
	2	5	7	4	1			2	2							1
		4	1	2	1	2			2							
	2	4	3	5	4			3								1
	4	1	5		3		2	1	1		1					
	14	22	12	9	5	2								1		
1	2	10	15	10	7	3	1					1			1	
	1	1			2											
2		4	5	3	3	2										
	9	17	9	11		1	5	1	2	2	2					
		2	1			1										4
	3	5		4	8	9	5	4	1	3	1	1				
1	4	12	16	22	7	3										1
	1	2	2													
	5	16	6	6	2	2										
		4	1	3	1		1									
1	5	12	6	6	2	1										
	1	7	6			1	2									8
	3	3			1											2
1	1	2	2	3	1											
	6	9	15	9	3	3	3									
			1	2	1											1
	1	3	6	3					1							
3	29	37	17	10	5	10	4	6	2							
	4	6	4	4		2	3		1							
	4	5	6	3	1	3		2								
	2	3	5	2	2	2										1
	7	20	14	6	3	3	2		3	1		1				2
1		4	6	2	2		1	1								1
	1	4	5	4	3											2
	1	3	3		1											

TABLE IV—

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Traverse	21	9	12	1	......	2	2	1	......	2	1	5	5	2	......
Wabasha	113	51	62	1	1	......	......	......	18	29	34	6	15	1	8
Wadena	9	2	7	......	......	2	3	1	......	1	1	......	......	......	1
Waseca	1	......	1	......	......	......	......	......	......	......	......	......	1	......	......
Washington	18	6	12	4	......	......	2	2	3	1	......	1	1	2	2
Watonwan	4	3	1	1	......	......	......	......	1	......	......	1	......	1	......
Wilkin	8	4	4	......	......	......	......	1	4	1	2	......	......	......	......
Winona	59	29	30	2	......	......	1	5	3	20	2	2	5	13	6
Wright	37	17	20	......	10	3	1	2	1	5	3	16	1	1	......
Yellow Med.	7	1	6	......	......	1	......	1	5	......	......	......	......	......	......
Total	2092	965	1127	187	159	149	150	189	221	216	167	193	175	145	141
CITIES over 5000 population															
Mankato	14	8	6	2	......	2	2	1	......	......	1	......	4	2	......
Cloquet	3	1	2	......	......	......	......	......	......	......	......	......	......	......	3
Brainerd	38	19	19	......	......	3	5	3	6	6	5	5	2	1	2
Red Wing	24	12	12	2	2	......	9	......	1	6	2	2	......	......	......
Minneapolis	17	10	7	3	1	3	......	4	......	1	......	1	......	3	1
Little Falls	39	17	22	2	......	2	......	4	2	......	13	3	5	......	8
Austin	36	17	19	......	7	3	7	16	2	......	1	......	......	......	......
Rochester	39	8	31	1	......	......	1	15	9	2	1	......	1	1	8
Crookston	6	4	2	2	......	......	......	......	......	2	......	......	......	2	......
St. Paul	6	3	3	......	......	1	2	......	2	......	......	1	......	......	......
Faribault	31	15	16	5	5	6	7	......	2	......	1	1	1	......	3
St. Cloud	24	10	14	5	4	3	......	......	......	......	......	4	1	4	3
Owatonna	13	7	6	5	1	1	2	......	......	1	......	......	......	2	1
Stillwater	6	1	5	3	......	......	......	......	......	1	......	1	1	......	......
Winona	24	16	8	......	......	......	......	......	......	......	1	2	3	12	6

DIPHTHERIA—Continued

FOR 1910

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
......	.....	6	1	8	2	3	......	......	......	......	1	......	......	......	......	......
1	13	22	23	18	16	7	8	1	1	1	......	......	1	......	......	1
1	3	1	1	1	1	......	1	......	......	......	......	......	......	......	......	......
......	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
......	4	1	3	1	3	1	1	1	1	2	......	......	......	......	......	......
......	1	......	......	......	1	1	......	......	1	......	......	......	......	......	......	......
......	......	2	2	2	......	......	2	......	......	......	......	......	......	......	......	......
......	2	14	15	7	7	2	......	4	......	1	......	......	1	......	......	6
......	3	14	11	1	2	1	1	1	1	......	......	......	......	......	......	2
......	......	2	1	2	1	......	......	1	......	......	......	......	......	......	......	......
19	263	509	431	319	184	107	778	47	40	23	11	7	4	1	1	48
......	2	1	1	4	......	2	......	......	1	......	......	......	......	......	......	......
......	2	......	......	......	1	......	......	......	......	......	......	......	......	......	......	......
......	3	12	4	9	5	2	1	2	......	......	......	......	......	......	......	......
......	3	5	4	8	1	2	......	......	......	......	1	......	......	......	......	......
......	2	1	1	1	3	4	2	1	......	1	......	......	......	......	......	1
......	10	17	4	1	4	2	......	......	......	......	......	......	......	1	......	......
1	1	7	11	7	5	3	1	......	......	......	......	......	......	......	......	......
......	2	2	......	4	7	8	5	4	1	3	1	1	......	......	......	1
......	......	4	......	1	......	1	......	......	......	......	......	......	......	......	......	......
......	......	2	1	......	......	......	......	......	......	......	......	......	......	......	......	3
......	2	6	10	6	3	2	1	......	......	......	......	......	......	......	......	1
......	1	10	7	1	1	1	1	......	1	......	......	1	......	......	......	......
1	......	2	5	......	2	......	1	1	......	......	......	......	......	......	......	1
......	2	......	......	1	1	......	......	......	......	2	......	......	......	......	......	......
......	1	5	7	2	2	1	......	1	......	......	......	......	......	......	......	5

TABLE V—SCARLET

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.
Aitkin	35	21	14	8	3	5	6	11	1						1
Anoka	4	2	2							2	1		1		
Becker	40	16	24	3	1	1	11	3	1		1			1	18
Beltrami	17	5	12	5	4	7		1							
Benton	2	1	1							1				1	
Big Stone	2	2													2
Blue Earth	8	2	6		2	2	2						2		
Brown	41	17	24			2	3	2	11	7	1			13	2
Carlton	9	5	4			7	1	1							
Carver	11	4	7		4	1	1		1	2	1	1			
Chippewa	16	8	8			6	3	5		1		1			
Chisago	41	24	17	12	4		2	6	1	3				12	1
Clay	38	19	19	10	8	4	7	1	5	1	2				
Cottonwood	1		1		1										
Crow Wing	8	5	3			4	1		1				1		1
Dakota	62	25	37	13	13	7	9	7		1	6	1	3	1	1
Dodge	21	12	9	6	3	6	3		1				2		
Faribault	3	3			2									1	
Fillmore	63	22	41	2	1	2	9	2		6	1	2	6	15	17
Freeborn	7	3	4		1									1	5
Goodhue	212	80	132	10	22	31	18	18	24	14	6	4	12	31	22
Grant	12	5	7											4	8
Hennepin	35	19	16	2	2	3	2	8				1	1	11	5
Houston	5	3	2			1				1	1			1	1
Hubbard	9	3	6					1							8
Isanti	32	19	13	1	1	4	11	8	5	2					
Itasca	18	8	10	13	2	2	1								
Jackson	18	7	11	6				2		10					
Kanabec	1		1			1									
Kandiyohi	1	1								1					
Kittson	7	2	5		3	4									
Koochiching	9	5	4											3	6
Lac qui Parle	10	6	4	2									1		7
Lake	6	3	3	4	2										
Le Sueur	53	27	26	7	24	1	1	9	2	1	2	1	2	3	
Lincoln	12	8	4	6		3					2				1
Lyon	67	33	34		4	19	25	10	4	1	4				
McLeod	4	4		3	1										
Marshall	1		1					1							
Martin	13	6	7	1				1	6			2			3
Meeker	6	2	4	1	3	2									
Mille Lacs	5	1	4					1	3	1					
Morrison	57	38	19	11	16	7	5	4	1	2	1	1	6	2	1
Mower	12	4	8	1	2	1	1			2	1		3	1	
Murray	12	7	5			1	6	1	1						3
Nicollet	6	2	4				1	1	1	2			1		
Nobles	19	8	11			7	3	2		5		2			
Norman	9	6	3	6			3								
Olmsted	49	24	25	2	4	1	13	1	3	1			5	5	14
Otter Tail	33	18	15	3	4	5	7	2	3	1	2				6
Pennington	9	3	6												9
Pine	17	8	9	4	4	5		1							3
Pipestone	6	5	1					6							
Polk	56	31	25	3	22	21	3	2			1				4
Pope	1		1					1							
Ramsey	31	13	18	5		7	3	5	4				3	4	
Red Lake	1	1				1									
Redwood	14	3	11	2		2		1				3	2	4	
Renville	13	6	7		4		5	1		2	1				
Rice	91	34	57	12	9	1	8	21	12	2	3	4	4	8	7
Roseau	16	6	10	4	1		2			1	7			1	
St. Louis	158	76	82	18	13	19	31	37	16	2	8	4	5	3	2
Scott	7	2	5	2				1	2						2
Sherburne	1		1		1										
Sibley	34	14	20				5	1	8	6		1	11	2	
Stearns	19	12	7		3	5		1	6					2	2
Steele	16	9	7	3	3	4	1		1	1	1			1	1
Stevens	5	3	2		3	1						1			
Swift	6	5	1				1	4				1			
Todd	14	8	6	1			1	1	1		1	1		8	
Wabasha	32	14	18	1		2	5	2			3	2	3	4	10

FEVER

FOR 1910

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
	5	12	14	3			1									
	1	1	1													1
	5	8	11	4	4	1	1	1								2
	4	7	5	1												
		1		1												
	1	1														
		4		2		2										
1	11	14	11	2	2											
	2	2	4	1												
	1	3	6					1								
	5	7	1	2												1
	4	15	10	2	2	1										7
	7	17	6	4	2	1				1						
		1														
	1	1	4	2												
	7	29	18	5		1		1								1
1	2	6	4	6	1											1
		3														
	8	23	15	5	1	1	1	1								8
	3	4														
1	42	86	48	21	4	2	2	1		1						4
		8	2	1	1											
	6	11	12	5												1
	2	2			1											
	1	3	1	2	1			1								
	7	9	11	2	1	1	1									
	5	4	5		2	1		1								
1	2	5	6	3												1
			1													
				1												
		2	4	1												
2	2			1	3		1									
	1	2	3	2	2											
			1	2	2											1
	12	18	14	2	5		1		1							
	1	4	1	2												1
	9	26	23	4	4											1
		1	2				1									
			1													
	1	5	3													4
	3	2	1													
	2		2			1										
	10	13	10	3		2	1									18
	1	8	2	1												
	3	2	3	1	2						1					
	3		3													
	1	8	5	2			1									2
	1	3	1	1												3
	9	21	11	3	2		1									2
1	4	12	10	4	1	1										
	1	4	1	2		1										
	1	6	2	6	2											
		1	3	2												
	5	16	16	13	2	1				1						2
																1
1	3	14	4	2	5											2
					1											
	1	9	2	2												
	3	2	1	5		1	1									
	11	23	32	16	4	2		1	1							1
	2	6	3	4			1									
3	37	62	31	11	7	1	1		1							1
	3	1	2		1											
		1														
	9	7	10	6	1	1										
	3	7	3	3	2											1
		9	3	2	1		1									
		1	2	2												
	3		1	1	1											
	1	6	3	2												2
	6	14	8	2				1	1							

TABLE V—

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Wadena......	8	4	4	......	1	......	2	3	1	......	1	......	......	......	......
Waseca	4	2	2	1	......	......	......	......	......	......	......	1	1	1	......
Washington ..	62	32	30	6	5	6	2	5	16	3	2	14	1	......	2
Watonwan ...	6	2	4	......	......	......	1	......	4	......	......	......	1	......	......
Winona......	48	34	14	......	......	1	......	1	......	......	4	4	10	12	16
Wright......	31	11	20	1	7	3	6	5	3	2	3	......	......	......	1
Yellow Med..	27	15	12	3	21	2	......	......	1	......	......	......	......	......	......
Total....	1895	898	997	204	234	227	231	208	150	87	67	52	87	156	192
CITIES over 5000 population															
Mankato.....	4	1	3	......	1	1	1	......	......	......	......	......	1	......	......
Cloquet.....	2	2	......	......	......	2	......	......	......	......	......	......	......	......	......
Brainerd.....	5	4	1	......	......	4	1	......	......	......	......	......	......	......	......
Red Wing....	131	48	83	7	20	29	17	7	10	7	6	3	8	7	10
Little Falls...	16	11	5	......	......	6	5	4	......	......	1	......	......	......	......
Austin.......	6	2	4	1	......	......	......	......	......	1	1	......	3	......	......
Crookston....	46	26	20	2	22	18	2	1	......	......	1	......	......	......	......
St. Paul......	2	2	......	......	......	1	1	......	......	......	......	......	......	......	......
Faribault.....	65	26	39	7	6	1	7	19	12	2	2	2	1	2	4
St. Cloud	7	6	1	......	......	......	......	......	5	......	......	......	......	......	2
Owatonna....	13	7	6	2	2	4	1	......	1	1	1	......	......	1	......
Stillwater	48	26	22	4	3	3	......	5	14	1	2	14	1	......	1
Winona......	34	23	11	......	......	......	......	......	......	......	4	4	10	8	8

SCARLET FEVER—Continued

FOR 1910

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	54 to 50	50 to 55	55 to 55	60 to 60	65 t9 65	Over 70	Un-known
	1	4		2												1
	2		2													
1	13	26	11	6	4	1										
		2	3	1												
	5	18	11	2	1		1	1								9
	6	10	8	6												1
1	4	13	8	1												
13	315	676	472	203	75	26	17	10	4	3	1	...		...	...	80
		2		1		1										
	1	1														
	1	1	1	2												
	22	58	32	12	3	1	1									2
	5	1	6	2		2										
		5	1													
	5	10	14	11	2	1				1						2
			1		1											
	9	18	22	11	2	2		1								
	2	2		1	2											
		7	3	1	1		1									
1	9	18	10	6	3	1										
	4	14	6				1	1								8

TABLE VI

SMALLPOX CASES REPORTED FOR 1910

COUNTIES	Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.
Aitkin	3					3							
Anoka	5		5										
Becker	3	3											
Beltrami	10	1	1	1			4						3
Big Stone	3					2							1
Blue Earth	4				1	1	1						1
Brown	1								1				
Carlton	3				3								
Carver	3					1	1	1					
Chippewa	1	1											
Chisago	11		2	6	2	1							
Clay	1											1	
Cook	2	2											
Cottonwood	1				1								
Crow Wing	5			5									
Dakota	8		3	5									
Dodge	2	1	1										
Douglas	6											3	3
Faribault	12		1	1	7		1	1	1				
Fillmore	23				12	10							1
Freeborn	20	3	15	2									
Goodhue	2				1	1							
Grant	1					1							
Hennepin	321	50	63	42	44	39	52	1	9	2	7	3	9
Houston	4		4										
Hubbard	1			1									
Isanti	2		1		1								
Isasca	1		1										
Kandiyohi	2			2									
Kittson	5				2		2					1	
Kooch ching	22		1	1	5		6						9
Lac qui Parle	1				1								
Lake	13	6	2	1	4								
Le Sueur	35						32						3
McLeod	1			1									
Martin	2			2									
Meeker	1						1						
Mower	37	14	10	5				4	1		2	1	
Nicollet	4		1	2						1			
Nobles	4	1											3
Norman	11	2		1									8
Olmsted	2		1	1									
Otter Tail	29	12	10	4								3	
Pipestone	2				2								
Polk	1			1									
Pope	3					1							2
Ramsey	179	2	4	9	15	22	14	8	2	7	9	10	77
Red Lake	4		3	1									
Renville	1						1						
Rice	10	1			1	6	1	1					
Rock	9	4	5										
Roseau	30	2	18	8	2								
St. Louis	86	10	6	23	7	19	10		3				8
Scott	1			1									
Sherburne	2	1		1									
Sibley	6	2	3										1
Stearns	5		4				1						
Steele	2						2						
Swift	6		3	2	1								
Todd	26			3							1	5	17
Wabasha	32	15	13			1	2						1
Wadena	19		15	1	1								2
Waseca	1					1							
Washington	4				2	1				1			
Watonwan	1									1			
Wilkin	1		1										
Winona	5				3	2							
Wright	35	22	5	5				2			1		
Yel. Medicine	10		9	1									
Totals	1,109	155	211	139	118	112	131	18	17	12	20	27	149

TABLE VI—Continued

SMALLPOX CASES REPORTED FOR 1910

COUNTIES	Total	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sept	Oct.	Nov	Dec
CITIES Over 5,000 Population													
Bemidji	1		1										
Mankato	2				1	1							
New Ulm	1								1				
Cloquet	3				3								
Brainerd	4			4									
Minneapolis	291	48	48	38	43	37	48		9	2	7	3	8
Austin	14	13	1										
Crookston	1			1									
St. Paul	160	2	3	9	12	22	12	8	2	7	9	10	64
Faribault	4					3	1						
Duluth	67	10	5	16	7	19			2				8
Hibbing	2	1							1				
Virginia	1	1											
Owatonna	2						2						
Stillwater	1									1			

TABLE VII—ANTERIOR

CASES REPOTRED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	3	2	1				2						1		
Becker	22	13	9	5					1			6	9	1	
Beltrami	25	15	10							10	11	2	2		
Big Stone	1	1									1				
Blue Earth	9	6	3					2			4	2		1	
Brown	9	3	6					1		4		3	1		
Carver	5	3	2								1	2	2		
Cass	9	4	5								2	3	4		
Clay	3	2	1								1		1		1
Clearwater	8	3	5			1				2	4	1			
Cottonwood	9	7	2					1			6	2			
Crow Wing	4	1	3								2	2			
Dakota	9	7	2			1			2	1	4	1			
Douglas	3	3		1		1					1				
Faribault	10	4	6				1			1	4	3	1		
Fillmore	2	2			1						1				
Freeborn	11	8	3						2		1	7	1		
Goodhue	3	1	2				1							2	
Grant	10	6	4	1						1	5	3			
Hennepin	49	34	15	1		2			3	3	17	17	5	1	
Houston	2	2			1				1						
Hubbard	6	2	4	1							1	1	2	1	
Isanti	2	1	1					1			1				
Itasca	5	3	2					1	1		1	1	1		
Jackson	3	3									2		1		
Kandiyohi	1		1							1					
Kittson	2	1	1		2										
Lac qui Parle	1	1											1		
Le Sueur	7	4	3						2	1	3	1			
Lyon	7	4	3									6	1		
Mahnomen	3	2	1							1	2				
Marshall	8	4	4							2	2	4			
Martin	3		3								1	1	1		
Meeker	5	3	2	2	1								2		
Morrison	12	5	7								3	4	5		
Mower	17	12	5						1	2	7	7			
Murray	12	6	5						1		6	1	3	1	
Nicollet	13	8	5							1	4	1	3	4	
Nobles	7	3	4								3	3	1		
Norman	9	6	3			1					3		4	1	
Olmsted	18	8	10								4	6	8		
Otter Tail	24	12	12								4	11	5	4	
Pennington	1	1													1
Pine	1		1								1				
Polk	30	17	13	2	4			2	1	6	5	3	2	3	2
Ramsey	3		3	1			1				1				
Red Lake	5	2	3							1	2	2			
Redwood	15	6	9						1	3	5	1	5		
Renville	4	2	2					2	1				1		
Rice	3	2	1								1		2		
Rock	2		2								1	1			
Roseau	2	1	1								1		1		
St. Louis	5	3	2			1				1		1		2	
Sherburne	1	1		1											
Stearns	3	1	2	1								1			1
Steele	1	1									1				
Todd	5	4	1									1	4		
Traverse	2		2								1		1		
Wabasha	1		1									1			
Wadena	7	5	2								1	3	3		
Watonwan	2	2										1	1		
Winona	4	2	2		2			1			1				
Wright	1	1											1		
Yellow Med	6	3	3						3	2	1				
Total	475	269	206	16	11	7	5	11	20	43	134	116	86	21	5
CITIES over 5000 population															
Mankato	3	2	1					2			1				
Minneapolis	47	33	14	1		2			2	3	16	17	5	1	
Austin	3	2	1							1	2				
Rochester	9	4	5								2	3	4		
Crookston	1		1												

POLIOMYELITIS

FOR 1910

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
	2	1														
2	5	7	5	1	1	1										
6	7	6	2				2				2					
				1												
	4	2		2		1										
	2	6					1									
	3	1							1							
	3	3	1	1		1										
	1	1		1												
1	3	2	1					1								
2	1	3	2	1												
	4															
	5	2	2													
1		1	1													
2	4	2		1	1											
	1	1														
	6	3	1	1												
1		1		1												
	4		1	5												
4	23	10	5	2	1	1										3
1				1												
1	2	1	1				1									
	1							1								
	2	1	1	1												
		2		1												
	1															
				2												
			1													
	3	1	1	2												
1	1	2	1		1				1							
	3															
	5	2	1													
	1		1	1												
	2		3													
	5	5	2													
	7	7	3													
	7	2	2				1									
1	6	4	1		1											
	3	3	1													
2		3	3	1												
	2	10	2	4												
1	3	8	2	6	4											
		1														
		1														
2	4	13	7	3	1											
		1	1				1									
1	1		2					1								
3	6	4	1	1												
	2	2														
	2		1													
			1		1											
				1	1											
2	1		2													
1																
	2											1				
		1														
2	2	1														
	1	1														
	1															
	2	2	2		1											
1	1															
	2	1														1
	1															
	1	4													1		
38	161	135	64	41	13	5	5	3	2		2	1		1		4
	1	1		1												
4	22	10	4	2	1	1									3	
	2	1														
	1	5	1	2												
			1													

TABLE

DEATHS FROM ALL

COUNTY	Pulmonary Tuberculosis	Non-Pulmonary Tuberculosis	Broncho Pneumonia	Lobar Pneumonia	Cancer	Diarrhoeal Diseases Under 2 Years	Diarrhoeal Diseases 2-5 Years	Acute Bronchitis	Chronic Bronchitis	Diphtheria	Whooping Cough
Aitkin	6	2	4	4	10	9	2	....	....	2	1
Anoka	17	6	2	10	8	5	1	....	3	1	....
Becker	9	2	8	3	7	19	2	1	1	2	....
Beltrami	9	8	4	14	5	24	4	1	....	10	4
Benton	9	2	6	6	5	20	2	....	1	2	4
Big Stone	4	2	3	5	5	8	2	1	....	....	....
Blue Earth	24	6	14	18	33	7	2	3	1	4	2
Brown	15	4	9	6	13	14	1	3	1	3	....
Carlton	20	2	5	8	6	27	4	2	1	5	3
Carver	12	4	8	6	7	4	....	3	1	7	....
Cass	14	1	4	2	6	5	1	1	....	3	....
Chippewa	6	3	9	8	13	8	1	....	....	1	....
Chisago	12	1	17	5	14	4	....	2	1	3	....
Clay	9	2	3	6	11	11	....	....	2	2	4
Clearwater	8	1	3	2	4	7	2	....	....	5	1
Cottonwood	7	3	2	3	8	11	3	....	....	3	1
Cook	....	....	....	....	....	....	....	....	....	....	....
Crow Wing	8	3	10	15	14	21	7	4	....	9	....
Dakota	24	7	6	8	27	12	....	1	....	10	....
Dodge	7	3	....	9	14	5	2	....	....	3	....
Douglas	19	4	5	4	13	10	1	....	2	....	1
Faribault	13	3	12	4	13	9	2	1	....	8	2
Fillmore	23	2	11	8	19	14	5	3	1	1	1
Freeborn	17	3	6	6	20	10	2	....	2	4	6
Goodhue	32	4	14	12	22	16	1	3	2	4	....
Grant	14	....	3	2	7	4	3	1	....	....	....
Hennepin	370	83	192	191	220	274	22	23	9	138	11
Houston	7	2	6	7	11	5	2	....	1	1	1
Hubbard	4	....	5	4	3	6	....	....	1	5	....
Isanti	15	1	9	10	6	10	1	....	2	....	1
Itasca	9	2	7	5	3	24	....	3	....	1	....
Jackson	9	3	8	5	15	9	....	2	....	2	3
Kanabec	3	1	2	4	3	3	....	....	....	....	....
Kandiyohi	15	3	6	7	17	5	....	4	....	3	1
Kittson	8	2	2	7	1	11	....	....	1	....	1
Koochiching	3	....	1	2	3	4	....	....	....	....	....
Lac qui Parle	9	4	2	5	4	11	5	1	....	5	....
Lake	5	2	1	8	4	7	1	....	....	7	....
Le Sueur	10	....	10	9	9	6	5	4	1	4	3
Lincoln	5	....	3	1	5	8	1	....	1	1	1
Lyon	11	3	6	2	10	14	3	3	....	1	4
McLeod	14	4	3	4	14	10	....	3	....	2	....
Mahnomen	2	2	2	....	1	....	....	....	....	....	....
Marshall	18	4	8	10	17	16	1	1	1	3	1
Martin	7	5	6	6	10	7	1	1	....	3	....
Meeker	15	6	4	12	13	11	2	1	....	2	....
Mille Lacs	5	1	1	6	4	10	2	....	....	4	1
Morrison	19	4	11	1	8	16	4	....	....	9	2
Mower	11	7	14	7	17	7	5	2	1	4	4
Murray	2	1	6	6	5	4	2	1	....	1	....
Nicollet	29	4	6	5	10	5	1	3	....	2	....
Nobles	7	5	5	1	8	10	1	1	1	4	....
Norman	15	2	3	4	10	11	....	....	....	2	4
Olmsted	29	16	18	32	65	9	6	2	1	6	....
Otter Tail	66	17	17	25	36	34	10	4	2	5	3
Pennington	3	....	1	1	1	....	....	....	....	....	....
Pine	15	3	4	8	7	11	....	....	....	1	5
Pipestone	9	1	4	1	9	5	....	....	....	....	1
Polk	30	3	17	12	20	33	2	4	1	11	9
Pope	8	6	3	6	10	13	1	....	....	2	5
Ramsey	225	84	126	112	180	189	11	15	11	146	15
Red Lake	10	....	2	7	7	9	....	....	1	7	3
Redwood	10	3	3	11	3	7	1	....	1	1	1
Renville	11	2	7	5	5	17	1	5	1	6	1
Rice	45	5	12	18	21	11	1	3	....	5	2
Rock	5	....	6	6	3	7	3	....	1	....	....
Roseau	9	1	4	3	3	7	1	2	2	4	5
St. Louis	143	39	114	106	67	280	27	8	1	37	32

No. VIII

CAUSES DURING 1910

Scarlet Fever	Measles	Typhoid	Poliomyelitis	Influenza	Puerperal Sepsis	Tetanus	Cerebro-Spinal Meningitis	Small Pox	Trichinosis	Mumps	Glanders	Accidents	All Other Causes (Including Stillbirths)	Total Deaths
3		3	2									10	42	100
2	6	6		1								7	85	160
3		3	14		3	1						17	92	187
	6	15	12									39	112	267
		1		1	1							11	55	126
		4	1	1			1					7	53	97
	5	1	3		1	3						28	210	365
6	3	1	3		1	3						11	130	227
	2	7										23	74	189
	2	2	1	1		2						9	111	180
2		3	5	1								10	48	104
4	1	1			3							15	54	127
		3		3			1					12	98	176
5	7	7	2		1							21	87	180
	1	4	5									6	51	100
	9	2	1									7	58	131
		1										5	4	10
1	5	22	4	2								20	117	269
5	1		6									24	135	266
1				1								7	68	120
	1	2	4	1	2	1						7	111	188
	1		3	2		2		1				18	118	212
2	3	4	2	1		1						7	183	291
1		1	5	1	1		1					11	130	227
3	3	4	1	4	3	1	1					17	223	370
2	1	2	5				1					5	49	99
58	50	187	16	4	23	6	2	1				295	2,131	4,306
			1									7	97	148
1	1	3	4		1							8	60	106
4	5	1	1		2		1					8	100	177
1	2	15	2			1						49	80	201
3	8		1	2	1							8	95	174
1		3		1								4	45	70
	2		1	2								7	113	186
1		2	1		1							6	32	76
3	1	5			1							21	19	63
	1	2	1			1						10	78	139
	3	14										18	52	122
	7	2	1	1	2		1	1				13	121	210
	2	1		3								3	41	76
3	1	4	3	3								12	71	151
1	2	4	1	2		1						9	109	183
		1			1								9	18
1	1	11	2	1	2							10	88	196
		2	2	1		2						9	79	141
			1									16	101	181
	1	1										9	58	101
5	6	6	4		2							9	135	241
		4	3	1	1							15	107	210
1			5		1							3	56	91
		18	2									6	100	191
2		1	3	1								8	70	128
		3	5			1						8	50	118
1		6		1	1							26	300	519
7	3	23	12	4	6	1	1					36	353	665
	1	3	1										4	15
1	1	1	1		3	1	1					19	55	140
				2		1						3	47	83
2	9	10	14		3		1					34	185	400
	1	1	1	1								5	71	131
62	37	44	3	3	13	2	2	1	1	1		151	1,333	2,767
1	5	7	4				1					5	92	161
1	6	2	6	1								12	81	150
1	4	2		2	1							17	107	195
3	1	3			1		1	1				15	185	336
				1				1				9	47	89
3	1	4										6	55	110
36	10	130	4	4	19		2					328	926	2,313

TABLE VIII

DEATHS FROM ALL

COUNTY	Pulmonary Tuberculosis	Non-Pulmonary Tuberculosis	Broncho Pneumonia	Lobar Pneumonia	Cancer	Diarrhoeal Diseases Under 2 Years	Diarrhoeal Diseases 2-5 Years	Acute Bronchitis	Chronic Bronchitis	Diphtheria	Whooping Cough
Scott	11	4	7	3	16	3	1	3	2	1	.....
Sherburne	5	.....	1	3	3	4	.....	2	.....	2	1
Sibley	7	6	11	2	9	8	.....	2	.....	1	.....
Stearns	31	14	16	15	31	37	6	4	2	6	6
Steele	10	2	9	10	16	8	4	1	2	2	3
Stevens	2	1	4	3	6	10	1	.....	.....	1	.....
Swift	7	5	7	5	5	13	2	.....	1	2	6
Todd	10	5	6	12	16	7	2	.....	1	1	.....
Traverse	.....	.....	2	2	3	2	1	.....	.....	1	1
Wabasha	7	2	5	9	15	6	3	.....	2	5	1
Wadena	6	2	1	2	5	8	2	.....	.....	1	.....
Waseca	10	5	4	2	9	13	1	5	3	1	.....
Washington	29	3	8	10	22	7	.....	1	1	2	4
Watonwan	3	4	8	1	3	3	.....	4	.....	.....	.....
Wilkin	3	.....	3	3	6	10	2	.....	.....	1	.....
Winona	17	5	12	22	23	20	2	3	1	7	.....
Wright	22	9	8	14	19	15	.....	2	.....	4	.....
Yellow Medicine	7	2	6	7	9	5	.....	.....	2	1	.....
Totals	1,780	478	950	983	1,391	1,599	200	153	77	566	172

—**Continued**

CAUSES DURING 1910

Scarlet Fever	Measles	Typhoid	Poliomyelitis	Influenza	Puerperal Sepsis	Tetanus	Cerebro-Spinal Meningitis	Small Pox	Trichinosis	Mumps	Glanders	Accidents	All Other Causes (Including Stillbirths)	Total Deaths
5	1	1	.....	.....	1	.....	.....	.....	.....	.....	.....	10	95	164
1	.....	3	1	.....	.....	.....	.....	.....	.....	.....	.....	4	56	86
2	3	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	98	153
1	5	11	2	1	2	1	.....	.....	.....	.....	.....	32	279	502
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	93	170
2	.....	3	.....	.....	.....	.....	2	.....	.....	.....	.....	7	48	90
4	1	1	.....	3	1	.....	.....	.....	.....	.....	.....	6	63	132
1	6	6	2	.....	1	.....	.....	.....	.....	.....	.....	13	128	217
1	.....	4	3	.....	.....	1	.....	.....	.....	.....	.....	3	30	54
3	1	2	.....	2	.....	.....	.....	.....	.....	.....	.....	11	141	215
.....	.....	1	3	1	.....	.....	.....	.....	.....	.....	.....	3	56	91
1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	78	141
6	1	7	1	1	2	.....	.....	.....	.....	.....	.....	18	146	269
.....	3	1	.....	.....	1	.....	.....	.....	.....	.....	.....	6	52	89
.....	1	9	.....	2	.....	.....	.....	.....	.....	.....	.....	10	55	105
10	9	4	2	2	1	.....	.....	1	1	.....	.....	26	248	416
2	.....	2	.....	2	1	1	.....	.....	.....	.....	.....	17	191	309
2	3	1	1	.....	2	.....	.....	.....	.....	.....	.....	11	63	122
284	263	688	201	75	113	34	20	7	2	1	.....	1,785	12,359	24,181

TABLE IX—DEATHS FROM PULMONARY TUBERCULOSIS IN 1910—Continued

COUNTY	Sex			Color			Month of Death												Age									
	Total	Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70
Aitkin	6	....	6	6	....	....	....	1	....	1	1	....	1	1	....	....	1	....	....	1	....	....	2	1	....	....	....	2
Anoka	17	10	7	17	....	....	2	....	3	3	....	1	2	3	....	1	....	2	....	....	....	....	....	6	5	4	2	....
Becker	9	3	6	9	....	....	1	....	2	2	1	1	....	1	1	....	....	....	....	....	....	....	2	4	2	1	....	....
Beltrami	19	13	6	19	....	....	2	2	....	3	2	4	3	....	....	1	1	1	1	....	....	....	1	9	3	3	1	1
Bemidji	**9**	**7**	**2**	**9**	....	....	....	**2**	....	**1**	**2**	**2**	**1**	....	....	....	**1**	....	....	....	....	....	**1**	**3**	**1**	**3**	**1**	....
Benton	9	7	2	9	....	....	1	....	....	2	2	....	....	2	....	....	....	2	....	....	....	....	2	2	1	1	2	....
Big Stone	4	1	3	4	....	....	1	1	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	3	1	....	....	....
Blue Earth	23	12	11	23	....	....	3	1	3	3	2	3	....	3	....	1	3	1	....	....	....	....	1	9	5	1	4	3
Mankato	**12**	**7**	**5**	**12**	....	....	**2**	**1**	**3**	**1**	**2**	**2**	....	....	....	....	**1**	....	....	....	....	....	....	**7**	**2**	**1**	**1**	**1**
Brown	15	6	9	15	....	....	1	1	1	1	1	2	3	....	....	3	1	1	....	....	....	....	2	9	2	1	....	....
New Ulm	**6**	**3**	**3**	**6**	....	....	**1**	....	**1**	**1**	....	....	**1**	....	....	**2**	....	....	....	....	....	....	**2**	**2**	**1**	....	....	....
Carlton	20	11	9	16	....	4	....	3	1	....	2	....	1	2	1	5	3	2	....	....	1	....	1	7	3	4	1	2
Cloquet	**11**	**5**	**6**	**11**	....	....	....	**2**	**1**	....	**1**	....	**1**	**1**	**1**	**3**	**1**	....	....	....	**1**	....	....	**3**	**3**	**2**	....	**1**
Carver	12	6	6	12	....	....	2	1	2	....	....	2	....	3	1	1	....	....	....	....	....	....	1	6	1	2	1	1
Cass	10	6	4	10	....	....	....	2	3	1	....	....	....	2	....	1	....	1	....	....	1	....	....	1	3	3	....	2
Chippewa	6	3	3	6	....	....	1	1	....	....	....	....	1	1	1	1	....	....	....	....	....	....	....	2	1	1	1	1
Chisago	12	9	3	12	....	....	....	....	1	....	2	1	1	2	3	....	2	....	1	....	....	....	....	5	2	2	1	1
Clay	9	4	5	9	....	....	2	....	2	3	....	....	....	....	....	1	....	1	....	....	....	....	2	4	....	1	....	1
Clearwater	8	2	6	8	....	....	1	2	1	....	2	....	....	....	....	....	1	1	....	....	....	1	2	2	1	....	....	1
Cottonwood	7	4	3	7	....	....	....	1	1	....	....	....	2	....	....	....	....	3	....	....	....	1	1	2	....	....	1	1
Crow Wing	8	4	4	8	....	....	....	....	2	....	1	1	....	1	....	2	....	1	....	....	....	....	....	2	3	3	....	....
Brainerd	**4**	**2**	**2**	**4**	....	....	....	....	**1**	....	....	**1**	....	**1**	....	**1**	....	....	....	....	....	....	....	....	**2**	**2**	....	....
Dakota	24	13	11	24	....	....	3	2	1	4	....	....	1	1	5	3	2	2	3	....	....	....	2	6	7	2	2	....
Dodge	7	....	7	7	....	....	1	1	1	1	....	1	....	....	2	....	....	....	1	....	....	....	1	1	2	1	1	....
Douglas	19	8	11	19	....	....	4	5	2	....	....	1	1	1	2	1	1	1	1	....	....	....	4	7	4	2	1	....
Faribault	13	7	6	13	....	....	1	....	....	....	1	3	....	2	1	1	....	4	1	....	....	....	2	7	....	2	....	....
Fillmore	23	11	12	23	....	....	....	3	1	4	2	4	2	3	1	2	....	1	....	....	....	....	3	6	1	5	3	3
Freeborn	17	5	12	17	....	....	2	2	2	2	1	2	1	2	....	1	2	....	....	....	....	....	....	9	2	3	2	....
Albert Lea	**3**	**1**	**2**	**3**	....	....	**1**	....	....	....	**1**	....	....	....	....	**1**	....	....	....	....	....	....	....	**2**	....	....	....	....
Goodhue	32	23	9	32	....	....	3	1	....	5	4	2	4	1	3	2	2	5	....	....	....	....	....	10	7	10	1	4
Red Wing	**12**	**8**	**4**	**12**	....	....	**1**	....	....	**2**	**2**	**2**	....	**1**	....	**1**	**1**	**2**	....	....	....	....	....	**5**	**2**	**2**	**1**	**2**
Grant	14	6	8	14	....	....	3	1	3	....	....	....	2	2	1	2	....	....	1	....	1	....	3	4	1	2	1	....
Hennepin	370	190	180	362	8	....	17	39	46	40	16	24	40	27	26	31	36	28	3	....	1	1	32	110	104	62	36	11
Minneapolis	**354**	**182**	**172**	**346**	**8**	....	**17**	**36**	**46**	**38**	**16**	**23**	**39**	**23**	**26**	**28**	**35**	**27**	**3**	....	**1**	**1**	**30**	**107**	**97**	**61**	**34**	**13**
Houston	7	1	6	7	....	....	....	....	....	....	1	1	....	2	1	1	1	....	....	....	....	....	1	3	1	2	....	....
Hubbard	4	2	2	4	....	....	....	1	....	....	1	....	....	....	1	1	....	....	....	....	....	....	....	2	1	1	....	....
Isanti	15	12	3	15	....	....	2	1	1	....	3	3	....	1	....	3	....	1	....	....	....	....	1	7	4	2	1	....
Itasca	9	7	2	9	....	....	1	....	2	1	....	....	....	1	....	1	1	2	....	....	....	....	2	1	1	3	1	1
Jackson	9	5	4	9	....	....	....	....	....	1	1	1	1	2	1	....	1	1	....	....	....	....	1	5	2	....	....	1

TABLE IX—DEATHS FROM PULMONARY TUBERCULOSIS IN 1910

COUNTY	Age			Conjugal Cond				Birth Place				Occupation																
	70 to 80	Over 80	Not Given	Single	Mar'd	W. & D.	Not Given	Minn	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Agent	Bar Keeper	Miner	Miscellan's.
Aitkin				3	3			3		3		5			1														
Anoka				10	6		1	7	2	8		10	4	2					1										
Becker				6	2	1		6	1	2		6	1		1												1		
Beltrami				11	6	2		4	6	8	1	5	3	3	1		1				1			1			1		3
Bemidji				**4**	**5**			**2**	**3**	**3**		**3**		**2**							**1**			**1**			**1**		**1**
Benton	1			4	3	2		3	2	4		2	4											1	1				1
Big Stone				3	1			4				3																	1
Blue Earth				13	6	4		13	7	3		13	3	2				1	2	1	1								
Mankato				**8**	**3**	**1**		**9**	**2**	**1**		**6**	**1**	**2**					**2**	**1**									
Brown	1			10	5			14		1		8	4	1			1		1										
New Ulm	**1**			**4**	**2**			**5**		**1**		**4**	**1**	**1**															
Carlton	1			11	8	1		6	2	11	1	8	1	6	2			1			2								
Cloquet	**1**			**5**	**5**	**1**		**2**	**1**	**7**	**1**	**6**		**2**	**1**			**1**			**1**								
Carver				4	7	1		6	2	4		7	3												1				1
Cass				2	8			4	4	2		6	2	1													1		1
Chippewa				2	4			3		3		3	2																1
Chisago				3	9			6	3	3		5	5					2											
Clay	1			5	2	2		5	2	2		5	1	1				1											1
Clearwater	1			5	2	1		4	2	2		7	1																
Cottonwood	1			4	2	1		4	1	2		4	1	1			1												
Crow Wing				2	4	2		2	2	4		4	1	1										2					
Brainerd					**3**	**1**			**2**	**2**		**2**												**2**					
Dakota	2			13	8	3		11	4	8	1	12	5	1	2				2								1		1
Dodge				3	4			5	1	1		6		1															
Douglas				7	11	1		14		5		11	3	1				1						1	1		1		
Faribault	1			9	3		1	6	2	5		7	3				1		1				1						
Fillmore	1	1		9	7	6	1	13	3	7		12	4	2	1		2			1									1
Freeborn	1			5	11	1		9	3	5		10	4		2				1										
Albert Lea	**1**			**1**	**2**			**2**		**1**		**2**							**2**										
Goodhue				17	13	1	1	20	3	8	1	8	10	6			1	1		3			1						2
Red Wing				**7**	**4**	**1**		**7**	**2**	**3**	**3**	**1**	**3**			**1**			**1**			**1**							**1**
Grant	1			9	5			7	3	4		14	2	1															
Hennepin	5	2		187	152	26	5	113	90	150	17	173	13	37	19	6	1	26	14	9		9	4	7	4	4	8		36
Minneapolis	**5**	**2**		**183**	**141**	**25**	**5**	**106**	**87**	**144**	**17**	**165**	**11**	**35**	**18**	**6**	**1**	**25**	**13**	**9**		**9**	**4**	**6**	**4**	**4**	**8**		**36**
Houston				4	3			6		1		6	1																
Hubbard				2	2			1	3			2	1	1															
Isanti				9	6			6	2	7		1	5	3			2		2					1					1
Itasca				3	4	1	1	3	2	4		5		2														2	
Jackson				5	4			5	2	2		5	2					1	1										

TABLE IX—DEATHS FROM PULMONARY TUBERCULOSIS IN 1910—Continued

COUNTY	Sex			Color			Month of Death												Age									
	Total	Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 60	50 to 60	0 to 70
Kanabec	3	....	2	3	....	....	1	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	1	1	1	....	....
Kandiyohi	15	6	9	15	....	....	....	1	4	3	3	....	2	....	....	....	1	1	....	....	....	....	1	5	6	2	1	....
Kittson	8	4	4	8	....	....	....	3	1	....	....	....	1	2	....	....	1	....	....	....	....	....	3	1	1	2	1	....
Koochiching	3	2	1	3	....	....	1	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	2	....	....	....	....	1
Lac qui Parle	9	2	7	9	....	....	1	....	....	....	1	....	2	3	....	1	....	1	....	....	....	....	1	5	3	....	....	....
Lake	5	4	1	5	....	....	....	....	....	....	1	....	....	....	2	1	1	....	....	....	....	....	3	2	....	....	....	....
Le Sueur	10	3	7	10	....	....	2	....	1	2	1	....	2	....	1	....	1	....	....	....	....	....	....	5	2	2	....	1
Lincoln	5	3	2	5	....	....	....	....	....	....	....	1	2	....	1	....	....	1	....	....	....	....	....	2	1	1	1	....
Lyon	11	6	5	11	....	....	3	1	2	1	1	1	....	....	....	1	....	1	....	....	....	....	....	5	2	....	2	1
McLeod	14	7	7	14	....	....	....	2	2	1	2	2	....	1	1	....	2	1	1	....	....	....	....	5	4	1	3	....
Mahnomen	2	....	2	2	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....
Marshall	18	13	5	18	....	....	....	1	1	....	6	3	1	2	....	....	3	1	....	....	....	....	3	5	3	2	3	1
Martin	7	4	3	7	....	....	3	1	1	....	....	....	1	....	....	....	1	....	....	....	....	....	1	3	2	....	1	....
Meeker	15	6	9	15	....	....	4	....	2	1	1	....	2	....	1	3	....	1	....	1	....	....	2	2	4	3	2	1
Mille Lacs	5	2	3	5	....	....	....	1	....	2	....	....	....	....	1	....	....	1	....	....	....	....	1	2	1	....	1	....
Morrison	19	5	14	19	....	....	1	2	2	3	....	2	....	1	1	2	5	....	....	....	....	....	2	2	7	5	1	1
Little Falls	6	1	5	6	....	....	....	1	1	2	....	1	....	....	....	....	1	....	....	....	....	....	1	2	1	2	....	....
Mower	11	7	4	11	....	....	....	1	....	....	5	1	1	....	....	1	2	....	....	....	....	....	2	4	2	....	1	2
Austin	5	3	2	5	....	....	....	1	....	....	1	....	1	....	....	1	1	....	....	....	....	....	2	2	....	....	....	1
Murray	2	....	2	2	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....
Nicollet	29	13	16	29	....	....	2	3	3	2	1	3	5	....	3	1	2	4	1	....	....	1	2	5	8	9	3	....
St. Peter	20	9	11	20	....	....	1	3	....	1	1	3	2	....	3	1	1	4	....	....	....	....	....	3	7	7	3	....
Nobles	7	5	2	7	....	....	....	3	....	1	3	....	....	....	....	....	....	....	1	....	....	....	1	2	....	2	....	1
Norman	15	4	11	15	....	....	1	1	3	1	....	2	1	3	....	2	1	....	....	....	....	1	4	5	1	2	1	....
Olmsted	29	12	17	29	....	....	5	1	3	5	....	4	3	2	3	....	3	....	....	....	....	....	3	9	10	3	....	3
Rochester	18	8	10	18	....	....	3	....	2	1	....	4	2	2	2	....	2	....	....	....	....	....	1	7	6	1	....	2
Otter Tail	66	44	22	66	....	....	7	5	5	1	6	3	9	9	8	5	4	4	2	1	1	2	6	11	11	15	9	6
Fergus Falls	40	34	6	40	....	....	3	3	3	1	4	1	3	6	6	3	3	4	....	1	1	....	....	6	5	13	9	5
Pennington	3	1	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	....	3	....	....	....	....
Pine	15	9	6	15	....	....	2	1	2	2	....	....	....	1	2	1	2	2	....	....	....	....	1	3	7	1	....	2
Pipestone	9	6	3	9	....	....	....	2	....	....	1	2	1	....	1	1	....	1	....	....	....	....	1	2	1	2	1	2
Polk	30	12	18	29	1	....	5	....	1	3	1	3	5	1	....	4	4	3	....	....	....	....	4	15	4	4	....	2
Crookston	8	3	5	7	1	....	1	....	....	....	....	....	3	....	....	2	1	1	....	....	....	....	1	4	1	1	....	....
Pope	8	5	3	8	....	....	2	1	....	1	1	1	....	....	....	1	1	....	....	....	....	....	....	3	1	3	1	....
Ramsey	224	137	87	215	8	1	18	15	28	26	18	14	22	14	9	19	21	14	....	2	1	....	25	68	43	31	31	21
St. Paul	218	135	83	209	8	1	18	14	28	25	17	14	21	13	8	19	27	14	....	2	1	....	24	66	40	31	31	21
Red Lake	10	4	6	10	....	....	1	....	1	1	3	1	....	....	2	1	....	....	....	....	....	....	3	2	2	....	2	....
Redwood	10	7	3	10	....	....	2	1	....	3	1	....	....	1	1	....	....	1	....	....	....	....	1	3	1	....	4	....
Renville	11	4	7	11	....	....	....	2	1	1	....	1	....	1	....	....	2	2	....	....	....	....	3	3	3	....	1	1

TABLE IX—DEATHS FROM PULMONARY TUBERCULOSIS IN 1910—Continued

COUNTY	Age			Conjugal Cond.				Birth Place				Occupation																	
	70 to 80	Over 80	Not Given	Single	Mar'd	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Labor- er	Do- mestic	Team- ster	Teach- er	Mer- chant	Office	Wood- worker	Woods- man	Ry.	Profes- sional	Me- chanic	Mason	Agent	Bar Keeper	Miner	Mis- cellan's.
Kanabec				1	2				1	2		1	1		1														
Kandiyohi				5	9	1		9	1	5		9	2			1				1		1							1
Kittson				4	4			2		6		5	3																
Koochiching				3				2		1		1	1	1															
Lac qui Parle				4	5			5	2	2		6	2																
Lake				5				4	1			3							1										
Le Sueur				2	8			7	2	1		8	1	1															
Lincoln				1	4			2	1	2		3								1									1
Lyon	1			6	5			4	2	4	1	7	2	1													1		
McLeod				4	10			9	1	4		6	4	1						1			1						1
Mahnomen				1	1			2				2																	
Marshall		1		10	7	1		5	1	12		6	10	2															
Martin				3	4			4	2	1		2	2				1		1										1
Meeker				7	7	1		8	1	6		10	1	1			1												2
Mille Lacs				2	3			2		3		3	1					1											
Morrison	1			11	7	1		6	5	8		12	2		1		1						1						2
Little Falls				5	1			2	2	2		3											1						2
Mower				6	3	2		3	3	4	1	6	3	1			1												
Austin				3	1	1		2	2	1		4		1															
Murray				1	1			1		1		2																	
Nicollet				18	8	3		9	3	17		25			1					1			1						1
St. Peter				12	5	3		4	3	13		19											1						
Nobles				3	3	1		3	3	1		3	2										1						1
Norman		1		11	3		1	10		5		8	3		3		1												
Olmsted	1			15	11	3		19	5	4	1	20	1	2	1			1				2		1					1
Rochester	1			8	8	2		10	4	4		13		1								2		1					1
Otter Tail	2			39	22	3	2	20	12	34		53	3	3	2				1	2									2
Fergus Falls				25	11	2	2	8	9	23		3	72							1									
Pennington				1	2			3				2																	1
Pine	1			4	9	2		4	3	8		7	5	1					1	1									
Pipestone				4	3	2		2	4	3		3	3	3															
Polk	1			15	14	1		16	6	8		15	3	3	6		1					1							1
Crookston	1			3	5			4	3	1		5			1							1							1
Pope				4	4			2	3	3		3	4	1															
Ramsey		2		110	87	23	4	57	90	75	2	116	2	20	6	4		11	10	3		4	1	7	2	2	3		31
St. Paul		2		108	84	22	4	54	89	73	2	111	2	20	6	4	2	11	10	3		4	1	7	2	2	3		30
Red Lake		1		5	4	1		4	1	5		7			1				2										
Redwood	1			2	7	1		4	3	3		5	2							2			1						
Renville				6	5			7	1	3		4	3				2		1										1

TABLE IX—DEATHS FROM PULMONARY TUBERCULOSIS IN 1919—Continued

COUNTY	Sex			Color			Month of Death												AGE									
	Total	Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70
Rice	45	25	20	45			6	3	4	7	2	7	7	3	2	1	2	1			1	2	12	14	12		2	
Faribault	**30**	**17**	**16**	**33**			**5**	**2**	**3**	**6**	**2**	**6**	**3**	**1**	**2**	**1**	**1**	**1**			**1**	**2**	**9**	**11**	**8**		**1**	
Rock	5		5	5				1		2	2												1	2			1	
Roseau	9	6	3	9					1	2	2	1	1	1		1							1	2	3	1	2	
St. Louis	143	85	58	140	2	1	14	15	7	15	15	14	7	12	12	10	12	10	8	4	4		9	43	36	24	7	6
Hibbing	**8**	**4**	**4**	**8**			**1**	**2**			**2**	**1**	**1**			**1**				**1**				**4**		**3**		
Virginia	**6**	**2**	**4**	**6**				**1**		**2**		**1**		**2**					**1**					**2**	**1**	**1**		
Eveleth	**4**	**2**	**2**	**4**						**2**	**1**			**1**										**1**	**3**			
Duluth	**82**	**53**	**29**	**79**	**2**	**1**	**10**	**8**	**1**	**8**	**7**	**8**	**4**	**6**	**10**	**4**	**9**	**7**	**1**	**2**	**2**		**5**	**27**	**22**	**14**	**4**	**5**
Scott	11	6	5	11			2	2		3	2	1			1								3	2	1	2	2	1
Sherburne	5	4	1	5			1	1	1								2							2	2			
Sibley	7	3	4	7			1			2	1						1	2					2	2	1	2		
Stearns	31	13	18	31			3	2	6	3	1	1	2	3	1	2	2	5				1	5	7	8	6	2	2
St. Cloud	**5**	**3**	**2**	**5**					**1**	**1**			**1**			**1**		**1**					**1**	**1**	**1**	**1**		**1**
Steele	10	3	7	10				1	1		2		1	1	1		1	2					1	2	3	1	1	
Owatonna	**6**	**2**	**4**	**6**				**1**	**1**		**1**			**1**			**1**	**1**					**1**		**3**	**1**	**1**	
Stevens	2	1	1	2											1	1								1	1			
Swift	7	3	4	7				2	1							1		3					1	2	1		2	1
Todd	10	8	2	10			1		1	1	2		1		1	1	1	1				1	1	4	2	1	1	
Wabasha	6	3	3	6				1		3						1	1								1	3	1	
Wadena	6	5	1	6						1	1			1	2		1						2	2	1	1		
Waseca	10	5	5	10			1		2	1		1			2		3							4	3	1	2	
Washington	29	15	14	29			3	2	1	3		4	2	4	4	1	1	4					4	9	5	8	2	1
Stillwater	**18**	**11**	**7**	**18**			**2**	**1**		**2**		**2**	**2**	**3**	**1**		**1**	**4**					**1**	**6**	**3**	**5**	**2**	**1**
Watonwan	3		3	3				1		1					1									1	1	1		
Wilkin	3	2	1	3				1	1			1												1		2		
Winona	17	7	10	17			1	3	3	3	1			2	1	1	1	1		1	1		2	7		3	3	
Winona	**16**	**6**	**10**	**16**			**1**	**2**	**3**	**3**	**1**			**2**	**1**	**1**	**1**	**1**		**1**	**1**		**2**	**7**		**2**	**3**	
Wright	22	10	12	22			1	2	3	2	5	1	2	1	1		2	2					3	10	2	3	2	1
Yellow Medicine	7	4	3	6		1	2		1							2	1	1		1			3			3		
Total	1773	955	818	1747	19	7	153	160	180	187	141	135	141	136	118	132	155	135	25	11	12	11	197	555	384	277	160	98

TABLE IX—DEATHS FROM PULMONARY TUBRECULOSIS IN 1910—Continued

COUNTY	Age			Conjugal Cond.				Birth Place				Occupation																	
	70 to 80	Over 80	Not Given	Single	Mar'd	W. & D	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Agent	Bar Keeper	Miner	Miscellan's
Rice	2	....	....	37	5	2	1	29	6	8	2	34	6	....	....	....	1	....	....	1	...	....	....	....	....	2	....	....	1
Faribault	1	....	....	29	3	..	1	21	6	1	2	30	1	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....
Rock	1	....	....	2	3	..	...	3	....	2	..	4	...	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Roseau		....	...	3	5	1	....	.	2	7	..	1	5	2	..	.	1	....	....	....	....	....	....	....	....	....	....	....	...
St. Louis	2		.	69	61	9	1	31	21	86	2	67	6	21	7	2	....	1	4	....	4	....	....	2	1	3	1	19	5
Hibbing				2	6		..	1	1	6	...	7	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
Virginia	1		.	1	4	1		2	1	3	...	6	.		....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
Renville				1	2	1			1	3	...	2	..	1		1	....	....	....	....	....	....	....	....	....	....	....	....	...
Duluth		.	.	48	28	6		16	16	49	1	29	1	18	6	1	....	....	4	....	4	....	....	2	1	3	1	7	5
Scott	....	....	....	5	4	2		6	1	4	....	5	3	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1
Sherburne	1	....	...	3	2	....	...	1	4	....	....	3	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sibley		..	...	2	4	..	1	7	..	....	....	4	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	...
Stearns	...	..	....	13	16	2	....	25	4	2	....	18	4	2	1	....	....	....	....	....	....	1	....	1	....	....	....	....	4
St. Cloud	. .	..	....	2	1	2	....	3	1	1	..	3	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Steele	2	..	. .	2	7	1	...	7	2	1	....	8	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	...
Owatonna	...	..	...	1	4	1	..	5	1	..	...	4	...	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	...
Stevens		..		2		.	..	1	..	1	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	...
Swift		..	.	3	4	.	....	2	1	4	....	4	2	...	....	....	1	....	....	....	....	....	....	....	....	....	....	....	...
Todd	....		.	7	3		..	4	3	3	...	3	3	2	....	....	....	....	....	....	2	....	....	....	....	....	....	....	...
Wabasha	1	.	.	1	4	1	.	3	2	1	....	4	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wadena	....	..	..	4	2	....	...	4	...	2	....	3	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Waseca	..	..	...	6	4	....		5	3	2	....	4	2	...	1	....	....	....	....	....	....	....	1	1	....	....	....	....	1
Washington	....	....	..	14	13	2		13	6	10	....	15	1	....	1	....	1	1	3	1	1	....	....	....	....	....	....	....	....
Stillwater	....	....	..	10	6	2	...	7	5	6	....	8	....	....	....	....	..	1	3	1	1	....	....	....	....	....	....	....	4
Watonwan	....	....	...	1	2		..	1	....	2	...	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wilkin	....	..	....	2	1	..	..	1	2	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Winona	....	....	..	8	4	3	2	10	3	4	...	9	....	1	1	....	1	1	1	1	....	....	....	....	....	....	....	....	2
Winona	....	...	....	7	4	3	2	9	3	4	..	9	...	1	1	....	...	1	1	1	....	....	....	....	....	....	....	....	2
Wright	1	..	..	11	11	.	.	12	2	8	.	14	5	1	....	....	..	1	....	....	....	....	....	....	....	....	....	....	1
Yellow Medicine	...		..	5	2	....	..	4	1	2	....	5	1	....	....	1	...	....	....	....	....	....	....	....	....	....	....	....	...
Total	5	8	.	893	733	125	22	717	376	619	31	940	199	149	63	14	24	54	50	29	11	18	13	27	10	10	17	21	124

TABLE X—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1910

COUNTY	Total	Sex		Color			Month of Death												Age									
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70
Aitkin	2	2	....	2	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	....
Anoka	6	1	5	6	....	....	1	1	....	1	....	....	1	....	1	1	....	....	....	....	1	....	1	2	....	1	1	....
Becker	2	1	1	2	....	....	....	....	1	....	....	....	....	....	....	1	....	....	1	....	....	....	....	1	....	....	....	....
Beltrami	8	4	4	8	....	....	1	3	1	2	....	....	....	1	....	....	....	....	3	....	....	....	1	3	1	....	....	....
Bemidji	**3**	**1**	**2**	**3**	....	....	....	**1**	**1**	**1**	....	....	....	....	....	....	....	....	**2**	....	....	....	....	....	**1**	....	....	....
Benton	2	1	1	2	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....
Big Stone	2	....	2	2	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....
Blue Earth	6	2	4	6	....	....	....	....	....	3	1	....	....	2	....	....	....	....	1	....	1	1	1	1	1	....	....	....
Mankato	**6**	**2**	**4**	**6**	....	....	....	....	....	**3**	**1**	....	....	**2**	....	....	....	....	**1**	....	**1**	**1**	**1**	**1**	**1**	....	....	....
Brown	4	1	3	4	....	....	....	....	....	....	....	....	1	2	1	....	....	....	....	....	....	1	1	....	1	....	1	....
New Ulm	**2**	....	**2**	**2**	....	....	....	....	....	....	....	....	....	**1**	**1**	....	....	....	....	....	....	....	....	....	**1**	....	**1**	....
Carlton	2	1	1	2	....	....	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	1	....	1	....	....	....
Carver	4	3	1	4	....	....	....	1	1	....	1	....	....	....	....	....	....	1	....	....	....	....	1	1	2	....	....	....
Cass	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....
Chippewa	3	1	2	3	....	....	....	1	....	1	....	....	....	....	....	....	....	1	....	1	....	....	1	....	....	1	....	....
Chisago	1	....	1	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....
Clay	2	1	1	2	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	2	....	....	....	....	....	....
Clearwater	1	....	1	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....
Cottonwood	3	3	....	3	....	....	....	....	....	2	....	....	....	1	....	....	....	....	....	1	....	....	1	1	....	....	....	....
Crow Wing	3	3	....	3	....	....	....	....	1	1	1	....	1	....	....	....	....	....	....	....	....	....	1	1	1	....	....	....
Brainerd	**2**	**2**	....	**2**	....	....	....	....	....	**1**	**1**	....	....	....	....	....	....	....	....	....	....	....	**1**	....	**1**	....	....	....
Dakota	7	3	4	7	....	....	2	....	....	....	1	....	....	1	....	1	1	1	....	....	....	1	....	1	1	2	....	1
Dodge	3	2	1	3	....	....	....	....	....	....	1	....	....	....	1	....	1	....	1	1	....	....	....	....	....	1	....	....
Douglas	4	3	1	4	....	....	....	1	....	1	....	....	1	1	....	....	....	....	1	....	....	1	....	2	....	....	....	....
Faribault	3	....	3	3	....	....	....	2	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1	....	1
Fillmore	1	1	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Freeborn	3	1	2	3	....	....	1	....	....	....	....	....	1	1	....	....	....	....	....	....	1	1	1	....	....	....	....	....
Albert Lea	**1**	....	**1**	**1**	....	....	....	....	....	....	....	....	**1**	....	....	....	....	....	....	....	**1**	....	....	....	....	....	....	....
Goodhue	4	3	1	4	....	....	1	....	....	....	1	1	....	....	....	....	....	1	....	1	....	....	....	2	1	....	....	....
Red Wing	**2**	**1**	**1**	**2**	....	....	....	....	....	....	....	**1**	....	....	....	....	....	**1**	....	....	....	....	....	**1**	**1**	....	....	....
Hennepin	83	44	39	81	2	....	4	10	8	4	9	8	5	8	10	6	2	9	8	9	6	3	9	16	11	10	6	3
Minneapolis	**78**	**41**	**37**	**76**	**2**	....	**4**	**10**	**8**	**4**	**7**	**8**	**5**	**8**	**9**	**5**	**2**	**8**	**7**	**9**	**4**	**3**	**9**	**16**	**10**	**9**	**6**	**3**
Houston	2	2	....	2	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....
Isanti	1	1	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Itasca	2	1	1	2	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	1	....	....	1	....	....	....	....	....
Jackson	3	2	1	3	....	....	....	1	1	....	....	....	....	....	....	....	....	1	1	1	....	....	....	....	....	1	....	....
Kanabee	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	....	....	....
Kandiyohi	3	1	2	3	....	....	....	....	....	....	....	1	1	....	1	....	....	....	....	1	....	....	2	....	....	....	....	....
Kittson	2	1	1	2	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	2	....	....	....	....	....

TABLE X—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1910—Continued

COUNTY			Conjugal Cond				Birth Place				Occupation																
	70 to 80	Over 80	Not Given	Single	Married	D. & W.	Not Given	Minn.	U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Miner	Agent	Miscellaneous
Aitkin				1	1				2			1																1
Anoka				4	1	1		3	2	1		5						1										
Becker				1	1			1	1			2																
Beltrami				7	1			5	1	2		5	1	1						1								
Bemidji				**3**				**3**				**2**								**1**								
Benton				1	1			1	1			1							1									
Big Stone				1	1			1		1		2																
Blue Earth				5	1			3	3			4				1							1					
Mankato				**5**	**1**			**3**	**3**			**4**				**1**							**1**					
Brown				2			2	2	1	1		4																
New Ulm							**2**		**1**	**1**		**2**																
Carlton				1	1			1		1		2																
Carver				3	1			2		2		3	1															
Cass				1				1				1																
Chippewa				2	1			2		1		3																
Chisago					1			1				1																
Clay				2				1	1			2																
Clearwater					1					1		1																
Cottonwood				3				2	1			2		1														
Crow Wing				2			1	1		1	1	1		2														
Brainerd				**1**			**1**	**1**			**1**	**1**		**1**														
Dakota	1			3	1			3	1	3		4	1	1				1										
Dodge				2	1			2		1		2	1															
Douglas				3	1			3		1		3	1															
Faribault				1	1	1		2		1		3																
Fillmore				1				1				1																
Freeborn				3				3				3																
Albert Lea				**1**				**1**				**1**																
Goodhue				2	1		1	3		1		2		1											1			
Red Wing					**1**		**1**	**1**		**1**		**1**													**1**			
Hennepin	1		1	56	19	7	1	45	15	20	3	54		8	5			1	2	1		1		1			1	9
Minneapolis	**1**		**1**	**52**	**18**	**7**	**1**	**41**	**14**	**20**	**3**	**53**		**8**	**5**			**1**	**2**			**1**		**1**			**1**	**9**
Houston				2				1		1			2															
Isanti				1				1				1																
Itasca				2				1	1			2																
Jackson				2	1			3				2										1						
Kanabec				1				1						1														
Kandiyohi				3				3				3																
Kittson				2				2				2																

TABLE X—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1910—Continued

COUNTY	Total	Sex		Color			Month of Death												Age									
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70
Lac qui Parle	4	2	2	4									1	1		1	1							1		2	1	
Lake	2	2		2										1	1					1							1	
Lyon	3	2	1	3			1					1					1			1			1					1
McLeod	4	2	2	4							3				1								3					1
Mahnomen	2	1	1	2							1	1							1	1								
Marshall	4	3	1	4			1			1		1	1						1	1			1	1				
Martin	5	2	3	5					1	1			1		1		1				2		3					
Meeker	6	4	2	6					2	2								2	1				2	1	1	1		
Mille Lacs	1	1		1								1													1			
Morrison	4	2	2	4			1			1				1			1			1	1			2				
Little Falls	**2**	**1**	**1**	**2**						**1**							**1**							**2**				
Mower	7	3	4	7				1				1		2		1	2		1			3		1	1		1	
Austin	**3**	**1**	**2**	**3**				**1**								**1**	**1**		**1**			**1**					**1**	
Murray	1		1	1									1														1	
Nicollet	4	1	3	4			1	1		1			1							1	1				2			
Nobles	5	2	3	5			1	1				1		1			1		1		1	1			2			
Norman	2	2		2									2											1	1			
Olmsted	16	9	7	16			1	1	1		2	2	1	3				5		1			1	3	5	4	2	
Rochester	**14**	**7**	**7**	**14**				**1**	**1**		**2**	**2**	**1**	**3**				**4**		**1**			**1**	**3**	**4**	**3**	**2**	
Otter Tail	17	11	6	17			2	1	3	1	2	1	2	4			1			1	1	1	1	5	4	1	3	
Fergus Falls	**8**	**4**	**4**	**8**			**2**		**1**			**1**	**2**	**1**			**1**							**1**	**4**	**1**	**2**	
Pine	2	2		2						1	1											1		1				
Pipestone	1	1		1														1										
Polk	3	3		3					1			1				1						2					1	
Crookston	**1**	**1**		**1**					**1**													**1**						
Pope	6	2	4	6					1	1	2				1			1					3	3				
Ramsey	84	41	43	81	3		8	6	8	6	10	10	4	9	2	9	7	5	9	4	4	12	10	18	14	5	7	1
St. Paul	**83**	**40**	**43**	**80**	**3**		**7**	**6**	**8**	**6**	**10**	**10**	**4**	**9**	**2**	**9**	**7**	**5**	**9**	**4**	**4**	**12**	**9**	**18**	**14**	**5**	**7**	**1**
Redwood	3		3	3						1		1					1						1		1			1
Renville	2		2	2							1				1					1						1		
Rice	5	1	4	5			1			1	2		1										1	4				
Faribault	**4**	**1**	**3**	**4**						**1**	**2**		**1**										**1**	**3**				
St. Louis	39	23	16	39			4	4	3	2	5	3	9	4	3			2	6	3	5	4	4	5	8	2	1	1
Hibbing	**5**	**3**	**2**	**5**							**2**		**2**	**1**					**3**		**1**				**1**			
Virginia	**1**		**1**	**1**					**1**													**1**						
Eveleth	**3**	**2**	**1**	**3**						**1**		**1**						**1**	**1**		**1**		**1**					
Duluth	**20**	**14**	**6**	**29**			**2**	**4**	**1**	**1**	**1**	**1**	**5**	**2**	**2**			**1**	**2**	**2**	**2**	**1**		**4**	**6**	**2**	**1**	
Scott	4		4	4						2				1	1								2	1		1		
Sibley	6	4	2	6					4						1		1						1	2	1	1		

TABLE X—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1910—Continued

COUNTY	Age			Conjugal Cond.				Birth Place				Occupation																
	70 to 80	Over 80	Not Given	Single	Married	D. & W.	Not Given	Minn.	U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Miner	Agent	Miscellaneous
Lac qui Parle				1	3			1	2	1		2	2															
Lake				1	1			2				1		1														
Lyon				2	1			2		1		2	1															
McLeod				3		1		2	1	1		3	1															
Mahnomen				2				2				2																
Marshall				3	1			3		1		3								1								
Martin				5				5				5																
Meeker				3	3			4		2		4	1				1											
Mille Lacs					1				1				1															
Morrison				3	1			4				3		1														
Little Falls				**1**	**1**			**2**				**1**		**1**														
Mower				1	3			4	3			7																
Austin				**2**	**1**			**2**	**1**			**3**																
Murray						1				1		1																
Nicollet				2	2			3		1		4																
Nobles				3	2			3	1	1		4	1															
Norman				1	1			1		1			1	1														
Olmsted				10	6			5	7	4		6	4	1			1		1	1				1			1	
Rochester				**9**	**5**			**4**	**6**	**4**		**6**	**3**				**1**		**1**	**1**				**1**			**1**	
Otter Tail				10	5	2		9	2	6		12	3	2														
Fergus Falls				**3**	**4**	**1**		**3**	**1**	**4**		**7**	**1**															
Pine				2				2				1		1														
Pipestone		1			1					1		1																
Polk				2	1			1	1	1		2	1															
Crookston				**1**				**1**				**1**																
Pope				5	1			5	1			5	1															
Ramsey				58	21	4	1	28	31	24	1	66	3	4	2	3		1	1				1					3
St. Paul				**57**	**21**	**4**	**1**	**27**	**31**	**24**	**1**	**66**	**2**	**4**	**2**	**3**		**1**	**1**				**1**					**3**
Redwood				1	2			1		2		3																
Renville				1	1			1		1		2																
Rice				4	1			5				5																
Faribault				**3**	**1**			**4**				**4**																
St. Louis				31	7	1		20	6	13		25	2	5	1	1	1				1						2	1
Hibbing				**4**	**1**			**5**				**5**																
Virginia				**1**				**1**				**1**																
Eveleth				**3**				**2**	**1**			**3**																
Duluth				**15**	**5**			**7**	**3**	**10**		**10**	**1**	**5**		**1**	**1**				**1**							**1**
Scott				3	1			3	1			4																
Sibley	1			6				5		1		3	1		1		1											

TABLE X—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1910—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age									
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 t9 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70
Stearns	14	7	7	14	....	....	1	1	2	....	2	....	1	....	2	2	2	1	1	2	....	....	2	2	4	1	1	1
St. Cloud	3	3	....	3	....	....	....	....	....	....	....	....	1	....	1	1	....	....	....	....	....	....	1	1	1	....	....	....
Steele	2	1	1	2	....	....	....	....	....	....	1	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	1	....
Owatonna	2	1	1	2	....	....	....	....	....	....	1	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	1	....
Stevens	1	1	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Swift	5	4	1	5	....	....	2	....	....	....	....	1	....	1	1	....	....	....	1	....	....	1	1	....	1	1	....	....
Todd	4	2	2	4	....	....	....	....	1	....	....	1	1	....	1	....	....	....	....	1	....	....	1	2	....	....	....	....
Wabasha	2	2	....	2	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....
Wadena	2	1	1	2	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	1	....	....	....	....	1	....
Waseca	5	3	2	5	....	....	1	....	....	....	1	....	1	....	1	....	....	1	1	1	....	....	....	2	....	....	1	....
Washington	3	3	....	3	....	....	....	....	....	1	....	1	....	1	....	....	....	....	....	....	....	....	....	1	....	1	1	....
Stillwater	2	2	....	2	....	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	1	....	....
Watonwan	4	2	2	4	....	....	....	....	....	....	....	1	....	....	....	1	....	2	....	1	2	....	....	....	1	....	....	....
Winona	5	2	3	5	....	....	1	....	....	....	....	1	....	1	....	....	1	1	....	....	....	....	1	2	1	....	....	1
Winona	2	1	1	2	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....	1	1	....	....	....	....
Wright	9	4	5	9	....	....	....	1	3	....	2	1	....	....	....	1	....	1	....	....	1	2	1	2	2	....	1	....
Yellow Medicine	2	1	1	2	....	....	....	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	....	1	....	..
Total	474	250	224	469	5	....	39	38	46	39	51	44	40	50	34	30	25	38	41	39	27	39	68	90	73	44	35	12

TABLE X—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1910—Continued

COUNTY	Age			Conjugal Cond.				Birth Place				Occupation																
	70 to 80	Over 80	Not Given	Single	Married	D. & W.	Not Given	Minn.	U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Miner	Agent	Miscellaneous,
Stearns	....	....	....	7	5	2	....	12	2	....	....	8	2	1	....	....	1	....	1	....	....	....	....	....	1	....	....	....
St. Cloud	....	....	....	2	1	....	....	3	....	....	....	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Steele	....	....	....	1	1	....	....	1	....	1	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Owatonna	....	....	....	1	1	....	....	1	....	1	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Stevens	1	....	....	....	1	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Swift	....	....	....	4	1	....	....	4	....	1	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Todd	....	....	....	4	....	....	....	4	....	....	....	2	....	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....
Wabasha	....	....	....	....	2	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Wadena	....	....	....	1	1	....	....	1	....	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Waseca	....	....	....	4	1	....	....	4	....	1	....	3	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Washington	....	....	....	1	1	1	....	....	1	2	....	2	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Stillwater	....	....	....	1	....	1	....	....	1	1	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Watonwan	....	....	....	4	....	....	....	3	1	....	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Winona	....	....	....	4	....	1	....	4	1	....	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Winona	....	....	....	2	....	....	....	2	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wright	....	....	....	7	1	1	....	8	1	....	....	6	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Yellow Medicine	....	....	....	1	....	1	....	1	....	1	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Total	4	1	1	324	120	24	6	265	93	111	5	334	37	31	11	5	5	5	6	4	1	3	3	2	2	3	1	18

TABLE XI—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	4	1	3	4			1	1		1							1	
Anoka	2	2		2					1	1								
Becker	8	4	4	8			1	1	2						1	2		1
Beltrami	4	2	2	4						2	1					1		
Bemidji	**3**	**1**	**2**	**3**						**1**	**1**					**1**		
Benton	6	2	4	6				1		2		1			1			1
Big Stone	3	1	2	3			1		1								1	
Blue Earth	14	6	8	14			2	1	1	2		1	2		1	1		3
Mankato	**4**	**2**	**2**	**4**			**1**			**1**			**1**					**1**
Brown	9	4	5	9					2	2		1				1		3
New Ulm	**5**	**2**	**3**	**5**					**2**									**3**
Carlton	5	4	1	1		4						4			1			
Carver	8	4	4	8			1		2						1		1	3
Cass	4	2	2	4				1	1		1	1						
Chippewa	9	4	5	9				1	2	1	1	1					1	2
Chisago	17	9	8	17			4	3	1	3	1						3	2
Clay	3	1	2	3							1				1		1	
Clearwater	3	1	2	3					1					1		1		
Cottonwood	2	1	1	2													1	1
Crow Wing	10	6	4	10				1	1	1	1		3			1		2
Brainerd	**9**	**5**	**4**	**9**					**1**	**1**	**1**		**3**			**1**		**2**
Dakota	6	3	3	6			1	1	1	1								2
Douglas	5	2	3	5			1		2	1		1						
Faribault	12	3	9	12			2	1	1	2	1		2	1		1		1
Fillmore	11	3	8	11			2		4				1		1	1	1	1
Freeborn	6	3	3	6					1	1								4
Albert Lea	**2**	**1**	**1**	**2**					**1**									**1**
Goodhue	14	4	10	14			1		1	2		1				3	3	3
Red Wing	**5**	**2**	**3**	**5**												**2**	**1**	**2**
Grant	3	2	1	3					1			1						1
Hennepin	192	94	98	187	5		16	16	19	15	17	17	7	11	11	15	18	30
Minneapolis	**184**	**90**	**94**	**179**	**5**		**15**	**15**	**18**	**14**	**17**	**17**	**7**	**11**	**11**	**15**	**16**	**28**
Houston	6	5	1	6				1	2			2					1	
Hubbard	5	3	2	5			1				1				1			2
Isanti	9	4	5	9				1	2		1				1			4
Itasca	7	5	2	7				1	1			1			1	1	1	1
Jackson	8	5	3	8					2	1	1			1			1	2
Kanabec	2	1	1	2							1							1
Kandiyohi	6	4	2	6			2	1							1			2
Kittson	2	1	1	2											1		1	
Koochiching	1		1	1								1						
Lac qui Parle	2	1	1	2				1	1									
Lake	1		1	1													1	
Le Sueur	9	4	5	9						2	1	1		1		2		2
Lincoln	3	2	1	3													1	2
Lyon	6	2	4	6			1		2					1		2		
McLeod	3		3	3						1		1	1					
Mahnomen	2	1	1	2			2											
Marshall	8	3	5	8					3		1			1		2		1
Martin	4	2	2	4			1					1			1			1
Meeker	4	2	2	4						1	2				1			
Mille Lacs	1		1	1														1
Morrison	11	4	7	11					1		2					1	4	3
Little Falls	**6**	**2**	**4**	**6**							**1**					**1**	**3**	**1**
Mower	13	5	8	13			2	3		2					3		1	2
Austin	**5**	**2**	**3**	**5**			**1**			**1**					**1**		**1**	**1**
Murray	6	2	4	6			1			3								2
Nicollet	6	3	3	6			2				1				1	1		1
St. Peter	**2**		**2**	**2**			**2**											
Nobles	5	2	3	5					1	2							2	
Norman	3	3		3					1		1						1	
Olmsted	18	7	11	18				1	3	1		1	2		1		5	4
Rochester	**7**	**6**	**1**	**7**				**1**	**1**				**1**		**1**		**2**	**1**
Otter Tail	17	8	9	17			2	4	3	2			1			1	1	3
Fergus Falls	**3**	**2**	**1**	**3**			**1**	**2**										
Pennington	1	1		1														1
Pine	4	3	1	4							1						2	1
Pipestone	4	1	3	4								2			1			1
Polk	17	11	6	17			4	5	1	1		1		1	1	1		2
Crookston	**3**	**2**	**1**	**3**			**1**	**1**	**1**									
Pope	3	1	2	3									1			1		1
Ramsey	126	66	60	125	1		11	8	23	12	18	10	10	3	5	5	7	14
St. Paul	**121**	**62**	**59**	**120**	**1**		**9**	**8**	**22**	**11**	**18**	**10**	**10**	**3**	**5**	**5**	**7**	**13**

PNEUMONIA (Broncho) IN 1910

Age													Conjugal Cond.				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid	Not Given	Minn.	Other U. S.	Foreign	Not Given
	1	1								1	1		2		2		2	2		
		1								1			1	1			1		1	
6	2												8				8			
1	1	1								1			4				3			1
1		**1**								**1**			**3**				**2**			**1**
	3			1						2			4	1	1		3		3	
1	1			1									3				3			
1									1	3	6		5	4	5		4	2	8	
1									**1**	**1**	**1**		**1**	**2**	**1**		**1**	**1**	**2**	
1	1	1									6		3	3	3		3		6	
1											**4**		**1**	**1**	**3**		**1**		**4**	
3		1		1									5				4	1		
2	1		1					1		3			1	1	3		4		4	
1	2				1								3	1			4			
3	2									2	2		5	2	2		5		4	
9		1							2	3	2		11	3	3		10	1	6	
1								1		1			1		2		1		2	
1		2											3				3			
2													2				2			
6		3							1				10				9		1	
5		**3**							**1**				**9**				**8**		**1**	
3	1	1							1				5	1			5		1	
2		1									2		3		2		3		2	
6									2	1	3		6	2	3	1	6	3	3	
3	2								2	3	1		5	1	5		5	4	2	
2					1				1		2		3	1	2		3		3	
1					**1**								**2**				**2**			
8	2	2					1	1					12	2			12	1	1	
4							**1**						**4**	**1**			**4**	**1**		
1	1										1		2		1		2		1	
82	33	15	6	3	1	6	2	7	9	18	9	1	145	26	21		126	29	35	2
79	**33**	**14**	**5**	**3**	**1**	**6**	**2**	**7**	**9**	**16**	**8**	**1**	**140**	**25**	**19**		**121**	**28**	**33**	**2**
1								1		1	2	1	1	2	3		1		5	
2			1							1	1		3	1	1		2	2	1	
	2	3						1		1	2		5	3	1		5		4	
4	1							1	1				5	1		1	5		1	1
4	1		1						2				6	1	1		6	1	1	
1									1				1		1		1		1	
2	1		1						1	1			4	2			4		2	
		1									1		1		1		1		1	
1													1				1			
2													2				2			
									1					1					1	
4	1		1							1	2		7	2			6	1	2	
1		1						1					2	1			2		1	
2	1	1		1						1			5		1		4	1	1	
1					1		1						1	2			2		1	
2													2				2			
3	1	1	1				1			1			6	2			6		2	
2										1	1		2	1	1		2	1	1	
1	1									1	1		2	1	1		1	2	1	
											1				1				1	
3	3		1						1		3		7		4		7	1	3	
	2		**1**						**1**		**2**		**3**		**3**		**3**	**1**	**2**	
5	2	1								3	2		8		5		8	1	1	
2	**1**	**1**								**1**			**4**		**1**		**4**		**1**	
2		1								3			3	2	1		3		3	
4									1	1			4		2		1		2	
1									**1**				**1**		**1**		**1**		**1**	
2										1	2		2		3		2	1	2	
1	1										1		2	1			2		1	
4	2					1	1	1	3	1	2		6	8	1		5	5	8	
1	**1**					**1**			**2**	**2**			**2**	**4**	**1**		**2**	**1**	**4**	
7	2	1					1			5	1		10	3	1		10	2	5	
1							**1**			**1**			**1**	**1**	**1**		**1**		**2**	
	1												1				1			
4													4				3	1		
2									1	1			2		2		2	2		
8	3	3					1		1	1			11	2	1		11		3	
2	**1**												**3**				**3**			
2	1												3				3			
59	20	12	1	2	2	3	2	3	6	12	4		99	11	16		68	33	25	
58	**19**	**12**	**1**	**2**	**2**	**3**	**2**	**3**	**5**	**11**	**3**		**97**	**9**	**15**		**66**	**33**	**22**	

TABLE XI—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Red Lake	2	....	2	2	....	....	....	....	....	1	....	....	....	....	....	1	....	....
Redwood	3	....	3	3	....	....	....	1	1	....	....	....	....	....	....	....	....	1
Renville	7	4	3	7	....	....	1	....	2	....	1	1	....	....	....	....	....	2
Rice	12	6	6	12	....	....	3	....	1	....	1	1	....	....	2	....	2	2
Faribault	6	3	3	6	....	....	....	....	1	....	....	1	....	....	2	....	1	1
Rock	6	4	2	6	....	....	....	....	1	1	1	....	1	....	....	....	....	2
Roseau	4	1	3	4	....	....	....	....	....	....	....	1	1	....	....	....	....	2
St. Louis	114	62	52	114	....	....	10	7	12	11	9	11	5	6	4	9	11	19
Hibbing	12	4	8	12	....	....	1	....	1	1	1	2	....	2	....	1	1	2
Virginia	5	4	1	5	....	....	....	1	....	1	....	....	1	....	....	....	1	1
Eveleth	2	1	1	2	....	....	....	....	....	1	1	....	....	....	....	....	....	....
Duluth	49	30	19	49	....	....	4	6	6	4	5	3	....	1	1	4	5	10
Scott	7	5	2	7	....	....	1	....	1	1	2	....	1	....	....	....	....	1
Sherburne	1	....	1	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Sibley	11	7	4	11	....	....	2	....	....	1	....	1	....	....	....	3	....	4
Stearns	16	7	9	16	....	....	3	1	1	1	....	2	....	....	1	1	1	5
St. Cloud	6	3	3	6	....	....	....	....	....	....	....	....	....	....	1	1	....	4
Steele	9	3	6	9	....	....	1	2	1	....	....	1	....	....	1	....	....	3
Owatonna	2	1	1	2	....	....	....	1	1	....	....	....	....	....	....	....	....	....
Stearns	4	2	2	4	....	....	....	....	1	....	....	....	....	....	....	....	1	2
Swift	7	5	2	7	....	....	1	2	1	....	2	....	....	....	1	....	....	....
Todd	6	2	4	6	....	....	1	1	....	1	1	....	....	....	....	1	....	1
Traverse	2	1	1	2	....	....	1	1	....	....	....	....	....	....	....	....	....	....
Wabasha	5	3	2	5	....	....	1	1	....	....	....	....	....	....	1	2	....	....
Wadena	1	....	1	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Waseca	4	2	2	4	....	....	1	....	....	....	....	....	....	....	....	....	2	1
Washington	8	5	3	8	....	....	1	2	1	....	1	1	....	1	....	....	....	1
Stillwater	2	2	....	2	....	....	....	....	....	....	....	1	....	....	....	....	....	1
Watonwan	8	2	6	8	....	....	....	3	2	....	....	....	....	....	1	....	1	1
Wilkin	3	2	1	3	....	....	1	....	....	....	....	1	....	....	....	....	....	1
Winona	12	5	7	12	....	....	1	....	5	....	2	....	....	....	....	....	2	2
Winona	8	2	6	8	....	....	1	....	5	....	....	....	....	....	....	....	1	1
Wright	8	4	4	8	....	....	1	1	....	1	1	....	1	....	....	....	1	2
Yellow Medicine	6	3	3	6	....	....	1	....	2	1	....	....	....	....	....	....	....	2
Total	948	464	484	938	6	4	93	76	124	85	77	70	39	28	49	61	81	165

PNEUMONIA (BRONCHO) IN 1910—Cont.

Age													Conjugal Cond				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 ot 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div or Wid	Not Given	Minn.	Other U. S.	Foreign	Not Given
1		1											2				1	1		
2	1												3				3			
3								1		2	1		3	1	3		3	1	3	
3	1		1	1				1	2	1	2		8	1	3		6	3	3	
1			1	1				1	1	1			5	1			3	2	1	
2	1	1							1	1			4	1	1		3		3	
1	2								1				3	1			3		1	
75	17	6	1			1	2	6	3		3		104	7	2	1	96	6	12	
8	1	3											12				11	1		
4	1												5				5			
2													2				2			
26	7	1		1		1	2	6	3		2		40	6	2	1	34	5	10	
3		1							1		2		4	1	2		4		3	
									1					1					1	
3	1	1		1			1			2	2		7	2	2		7		4	
7	2							1	2	2	2		10	3	3		9	2	5	
3	1									1	1		4		2		4		2	
4	1					1			1		2		6	1	2		5		4	
1											1		1		1		1		1	
2	1		1										4				4			
3		1							2		1		4	3			4	1	2	
2									2	1	1		2	2	2		2	2	2	
1	1												2				2			
2										1	2		2	2	1		2		3	
1													1				1			
										3	1			2	1	1		1	3	
5										3			5	2	1		5	1	2	
2													2				2			
4	2	1								1			7	1			7		1	
	1									1	1		1	2			1		2	
2									2	4	4		2	1	8	1	2	3	7	
1									2	2	3		1	1	6		1	1	6	
6		1								1			7	1			7		1	
4							1		1				5		1		3	2	1	
420	128	68	17	11	6	12	14	27	58	102	83	2	672	130	141	5	596	120	228	4

TABLE XII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	3	2	1	3				2		1								
Anoka	10	7	3	10				3		3					1	1	1	1
Becker	3	2	1	2		1					1	2						
Beltrami	11	12	2	13		1	1		5	1	1					1	2	3
Bemidji	**6**	**5**	**1**	**6**					**1**		**1**						**2**	**2**
Benton	6	3	3	6			1	1		1					1		1	1
Big Stone	5	3	2	5				1		3		1						
Blue Earth	18	9	9	18			1	3	3	2	2	3	1	1				2
Mankato	**10**	**5**	**5**	**10**				**2**	**2**		**1**	**2**	**1**	**1**				**1**
Brown	6	3	3	6			1											5
New Ulm	**3**	**2**	**1**	**3**														**3**
Carlton	8	3	5	8				1				1		1	1		1	3
Cloquet	**4**	**2**	**2**	**4**								**1**		**1**	**1**		**1**	
Carver	6	5	1	6			1			2					1		1	1
Chippewa	8	6	2	8			1	1	1		1					1	1	2
Chisago	5	2	3	5						1	1				1			2
Clay	6	1	2	6			1	2	1								1	1
Clearwater	2	1	1	2				1								1		
Cottonwood	3	2	1	3												2		1
Crow Wing	15	10	5	15			2	1	3	2	2			1		1		3
Brainerd	**13**	**8**	**5**	**13**			**1**	**1**	**3**	**2**	**1**			**1**		**1**		**3**
Dakota	7	5	2	7					1	1	1	1				1	1	1
Dodge	9	5	1	9					2	2		2	1	1				1
Douglas	4	1	3	4			1	1			1						1	
Faribault	3	3		3			1	1										1
Fillmore	8	4	1	8				1	2	1	2							2
Freeborn	6	1	5	6			1	1				2						2
Albert Lea	**3**	**1**	**2**	**3**				**1**				**2**						
Goodhue	12	5	7	12			1		1	1			1	1	1	1		5
Red Wing	**3**	**1**	**2**	**3**						**1**					**1**			**1**
Grant	2	1	1	2						1								1
Hennepin	190	113	77	185	5		17	18	18	18	12	13	12	6	11	16	15	34
Minneapolis	**181**	**112**	**69**	**176**	**5**		**16**	**17**	**18**	**17**	**11**	**11**	**12**	**6**	**11**	**15**	**14**	**33**
Houston	7	4	3	7			5	1			1							
Hubbard	4	2	2	4			1					1						2
Isanti	9	7	2	9					2	1				1			1	4
Itasca	5	2	3	5			1	1	3									
Jackson	5	3	2	5			1	1			1				1			1
Kanabec	4	1	3	4			1										1	2
Kandiyohi	7	3	4	7								1	1	1			1	3
Kittson	7	3	4	7			1		1	3		1	1					
Koochiching	2	2		2							1					1		
Lac qui Parle	5	2	3	5				1	1	1							1	1
Lake	8	6	2	8			1			1	2			2	2			
Le Sueur	9	3	6	9				1	1		2	1				1		3
Lincoln	1	1		1													1	
Lyon	2		2	2										1				1
McLeod	4	1	3	4							1				1	1		1
Marshall	10	6	4	10				2	1	1		1			2	1	1	1
Martin	6	2	4	6			1	1				1					1	2
Meeker	11	5	6	11				4	3		1						2	1
Mille Lacs	5	3	2	5				1	2		1							1
Morrison	1		1	1													1	
Mower	7	4	3	7			2		2				1					2
Austin	**3**	**2**	**1**	**3**			**1**						**1**					**1**
Murray	6		6	6			1		1	1		1						2
Nicollet	5	2	3	5			1			1		1			1			1
St. Peter	**1**	**1**		**1**														**1**
Nobles	1	1		1								1						
Norman	4	2	2	4			2	1									1	
Olmsted	32	21	11	32					6	3		4		3		2	7	7
Rochester	**31**	**21**	**10**	**31**					**6**	**3**		**4**		**3**		**2**	**7**	**6**
Otter Tail	25	18	7	25			4	6	1		3	2			1	1	4	3
Fergus Falls	**11**	**9**	**2**	**11**			**1**	**2**			**2**	**1**			**1**	**1**	**2**	**1**
Pennington	1	1		1														1
Pine	8	7	1	8										1	2	2	1	2
Pipestone	1	1		1						1								
Polk	11	3	8	11			1	1	3	1		2					1	2
Crookston	**3**	**1**	**2**	**3**					**1**			**1**						**1**
Pope	6	5	1	6			1				1		1	1			1	1
Ramsey	107	69	38	105	2		15	3	8	10	14	11	7	5	3	9	10	12
St. Paul	**102**	**66**	**36**	**100**	**2**		**15**	**3**	**8**	**10**	**13**	**11**	**7**	**5**	**2**	**9**	**10**	**9**
Red Lake	7	2	5	7					1	1	2	1					1	1
Redwood	11	5	6	11					1		1	1				1	2	5
Renville	5	2	3	5			2		1	1	1							

PNEUMONIA (LOBAR) IN 1910

Age													Conjugal Cond.				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid.	Not Given	Minn.	Other U. S.	Foreign	Not Given
		1			1					1			1	1	1		1		2	
				3		1	1	2	3				3	6	1		3	1	5	1
1							1	1					2	1			1		2	
	1	1		1	3	2	1	3	1	1			8	4	1	1	3	5	6	
				1	**2**	**1**	**1**		**1**				**4**	**1**		**1**	**1**	**3**	**2**	
	1		1	1	1	1				1			4	2			1	1	1	
1						1	1	1	1				2	3			2		3	
2			1	1	1	1	1	2	1	5			8	8	2		6	2	10	
2			**1**	**1**	**1**		**1**		**3**	**1**			**5**	**4**	**1**		**5**	**1**	**4**	
1	1		1				1	1	1				4	2			5		1	
1	**1**						**1**						**3**				**3**			
4		1				1	1	1					5	2	1		6		2	
2		**1**				**1**							**3**	**1**			**3**		**1**	
1		1	1	1	1			1					4	2			1		1	1
		1		1				1	4	1			2	6			2	2	1	
			1		1				2	1			2	2	1		2	1	2	
1	1	1					1		2				4	2			3	1	2	
	1			1									2				1	1		
				1		1			1				1	1	1		2		1	
3					1	1	3	2	5				3	10	2		3	2	10	
3					**1**	**1**	**3**		**5**				**3**	**9**	**1**		**3**	**1**	**9**	
			1		1	3				2			2	3	1	1	3	1	3	
			1		2	1	1	1	2	1			1	2	3		5	2	2	
					1		1	1		1				2	2			2	2	
	1			2									3				2	1		
1			1				1	1	1	2	1		3	5	1	1	2	2	4	
					1		1	1	1		2		1	1	1		1	2	3	
							1	**1**	**1**				**1**		**2**			**2**	**1**	
2					1		3		2	1	3		3	5	1		3	2	7	
					1						**2**			**1**	**2**		**1**	**1**	**1**	
								1	1					1	1			2		
12	9	8	5	11	14	22	28	28	31	17	5		72	84	32	2	48	53	79	10
12	**9**	**6**	**4**	**11**	**14**	**22**	**26**	**25**	**30**	**17**	**5**	....	**69**	**79**	**31**	**2**	**44**	**52**	**75**	**10**
				2			1		2	1	1		3	2	2		2	2	3	
				1	1			1		1			1	2		1	2	1		1
1					1	2		2	3				2	5	2		3		6	
3						1			1				4		1		3		1	1
				1	1	1		1	1				2	3			2	1	2	
		1		1			1		1				2	2			1	1	1	1
1		1			1					3	1		2	1	1		3		4	
1			2		2		1			1			5	1	1		4		3	
	1					1							2				1	1		
							1	1	2	1				1	1				5	
					3	3		2					4	1	2	1		1	7	
2								2	3	1	1		2	3	4		2	2	5	
								1						1			1			
					1					1				2				1	1	
				1					2	1			1	2	1		1	1	2	
2				2	2	3	1						7	3			4	3	3	
3			1								2		1		2		3	2	1	
1				1	2		2		2	3			4	1	3		4		7	
1				1		1	1			1			3	2			2	2	1	
						1								1					1	
1			1		1	2		1	1				2	4		1	2	3	2	
1							**1**			**1**			**1**	**1**		**1**	**1**		**2**	
	1				2	1		1		1			1	1	1		2	2	2	
	1			1					1	2			2	1	2		2		3	
									1					**1**					**1**	
								1						1					1	
				1					1	1	1		1	2	1		1		3	
	1				1	2	3	12	4	6	3		5	17	9	1	3	15	13	1
	1				**1**	**2**	**2**	**12**	**4**	**5**	**3**		**5**	**17**	**8**	**1**	**3**	**15**	**12**	**1**
1	1		1	2		1	6	6	4	3			11	11	3		5	5	15	
1	**1**					**1**	**2**	**5**	**1**				**7**	**3**	**1**		**2**	**1**	**8**	
	1												1				1			
						1	2	3	2				2	6			1			7
								1						1				1		
	3					2	1	1	2	2			1	6	1		4	1	6	
								1	**1**	**1**				**3**				**1**	**2**	
1			1	1			1		2				3	3			3		3	
2	1	7	4	6	11	16	15	15	17	9	4		49	46	12		18	11	48	
1	**1**	**6**	**4**	**6**	**11**	**16**	**14**	**15**	**15**	**9**	**4**		**47**	**45**	**10**		**15**	**41**	**46**	
		1	1		1		1		3				1	2	1		1	1	5	
1	1			2			2		1	1	3		5	4	2		1	2	5	
		1		1	1				1		1		3		2		2	1	2	

TABLE XII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rice	18	12	6	18	...	...	2	4	1	1	1	...	3	...	...	1	3	2
Faribault	10	5	5	10	...	...	...	4	1	1	...	...	2	...	...	...	1	1
Polk	6	3	3	6	...	...	...	...	1		...	1	...	...	...	...	1	3
Roseau	3	2	1	3	...	...	...	...	...	...	1	1	...	...	1	...	...	...
St. Louis	106	87	19	105	1	...	13	11	14	18	10	7	5	2	8	6	6	6
Hibbing	11	11	...	11	...	...	3		2	2	2	...	1	...	...	1	...	...
Virginia	13	10	3	13	...	...	1	1	1	2	1	...		...	2	2	2	1
Eveleth	9	9	...	9	...	...	1	2	2	1		...	...	...	3	...	...	
Duluth	46	35	11	45	1	...	7	6	6	6	3	3	3	1	1	2	3	5
Scott	3	2	1	3	...	...	...	...	...	...	...	...	1	...	...	...	...	2
Sherburne	3	2	1	3	...	...	...	1	1		...	...		...	...	...	...	1
Sibley	2	1	1	2	...	...	...	...	1		1	...	...	...	...	...	...	...
Stearns	15	8	7	15	...	...	1	...	2	1	2	...	...	...	...	1	2	6
St. Cloud	4	3	1	4	...	...	...	...	...	...	...	...	...	...	...	...	1	3
Steele	9	2	7	9	...	...	1	1	1	...	1	...	...	...	...	1	2	2
Owatonna	2	...	2	2	...	...	...	...	1	...	...	...	...	...	...	...	1	
Stevens	3	2	1	3	...	...	...	...	...	...	...	...	...	...	...	1	2	...
Swift	5	3	2	5	...	...	1	4	...	...	...	...	...	...	...	...	...	...
Todd	12	5	7	12	...	...	1	...	3	...	...	2	...	...	...	...	1	5
Traverse	2	2	...	2	...	...	...	2	...	...	...	...	...	...	...	...	...	...
Wabasha	9	3	6	9	...	...	2	...	1	...	...	3	...	...	...	...	1	2
Wadena	2	1	1	2	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Waseca	2	1	1	2	...	...	...	...	...	1	...	...	...	...	...	...	...	1
Washington	10	5	5	10	...	...	1	4	...	1	1	...	...	...	1	...	...	2
Stillwater	4	2	2	4	...	...	...	2		1	...	...	...	...	1	...	...	...
Watonwan	1	1	...	1	...	...	...	...		...	...	...	1	...	...	...	...	...
Wilkin	3	1	2	3	...	...	1	...	...	1	...	...	...	1	...	...	...	...
Winona	22	11	11	22	...	...	2	...	3	2	1	1	...	...	2	2	2	7
Winona	17	8	9	17	...	...	1	...	3	1	1	...	...	...	2	2	2	5
Wright	14	6	8	14	...	...	3	...	1	1	1	2	...	...	...	...	3	3
Yellow Medicine	7	5	2	7	...	...	...	1	2	3	...	...	...	...	...	...	...	1
Total	965	576	389	955	8	2	101	89	106	95	75	72	36	30	42	56	86	177

PNEUMONIA (LOBAR) IN 1910—Continued

Age													Conjugal Cond				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid	Not Given	Minn.	Other U. S.	Foreign	Not Given
2				1		2	2	3	3	3	2		4	8	5	1	5	4	8	1
1				1		2	1	2	1	1	1		2	5	3		3	3	4	
1	1		1						2	1			3	2	1		2	3	1	
				2	1								2	1			2		1	
11	6	4	6	4	10	24	72	9	7	2	1		59	33	7	7	31	17	53	5
	1	1	1			7		1					7	4			5		6	
1			1	2		5	2	1	1				6	6		1	2	1	10	
1					1	3	3			1			6	1	1	1	1	1	7	
5	2	3	2	1	4	5	11	6	6		1		25	14	4	3	13	14	16	3
1			1	1									3				3			
							1			1	1			2	1		1		2	
			1								1		1		1		1		1	
4		1			2	3	2	1	2				8	5	2		9	4	2	
1					1		1		1				2	1	1		3		1	
3		1			1					3	1		5	2	2		4	2	3	
		1								1			1		1		1	1		
					1			1		1				3			1	1		1
							1	1		1	2			3	2			2	3	
2		2		3	2	1				1	1		8	3	1		7	3	2	
						1					1			2				1	1	
					2		1	2	2		2		4	5			2	3	3	1
										2			1	1				1	1	
							1	1						2					2	
1				4			1		2	1	1		6	4			3	2	5	
1				1					2				3	1			1	1	2	
1													1				1			
				1				2					1	1	1			1	2	
6	1	1	1	1				1	5	4	2		11	7	4		19	3	9	
6	1			1				1	4	3	1		9	6	2		9	2	6	
2	1					1	4		2	4			3	8	3		4		10	
1	1						1	2	1	1			2	4	1		2	3	2	
85	36	34	33	65	78	104	123	121	144	99	43		405	399	144	17	286	222	433	21

TABLE XIII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Becker	1		1	1												1		
Beltrami	1	1		1								1						
Bemidji	**1**	**1**		**1**								**1**						
Big Stone	1		1	1											1			
Blue Earth	3		3	3			1						1					1
Mankato	**3**		**3**	**3**			**1**						**1**					**1**
Brown	3	2	1	3				1						1				1
New Ulm	**1**	**1**		**1**				**1**										
Carlton	2	1	1	2													1	1
Cloquet	**2**	**1**	**1**	**2**													**1**	**1**
Carver	3	2	1	3													1	2
Cass	1	1		1													1	
Chisago	1		1	1						1								
Crow Wing	4	3	1	4					1	1					1			1
Brainerd	**3**	**2**	**1**	**3**						**1**					**1**			**1**
Dakota	1	1		1				1										
Faribault	1	1		1													1	
Fillmore	3	3		3					1							1		1
Goodhue	3	1	2	3			1			1						1		
Grant	1		1	1					1									
Hennepin	22	9	13	21	1		2	1	3	2		1	1	1	1	2	5	3
Minneapolis	**20**	**8**	**12**	**19**	**1**		**2**	**1**	**2**	**1**		**1**	**1**	**1**	**1**	**2**	**5**	**3**
Itasca	3	2	1	3							1					1		1
Jackson	2	1	1	2									1					1
Kandiyohi	4	3	1	4							1	1					1	1
Lac qui Parle	1		1	1						1								
Le Sueur	4	1	3	1						1	1			1			1	
Lyon	3	2	1	3			1									1		1
McLeod	3	2	1	3					1			1				1		
Marshall	1		1	1							1							
Martin	1		1	1			1											
Meeker	1	1		1				1										
Mower	2	1	1	2						1							1	
Murray	1		1	1													1	
Nicollet	3	1	2	3			1										2	
St. Peter	**2**	**1**	**1**	**2**			**1**										**1**	
Nobles	1		1	1														1
Olmsted	2	1	1	2													1	1
Otter Tail	4	2	2	4				1	1							1	1	
Fergus Falls	**1**	**1**		**1**												**1**		
Polk	4	2	2	4				2							1			1
Crookston	**1**		**1**	**1**											**1**			
Ramsey	15	10	5	15			1	2		2	4	1		1			1	3
St. Paul	**12**	**8**	**4**	**12**			**1**	**1**		**2**	**2**	**1**		**1**			**1**	**3**
Renville	5	3	2	5			1	1									1	2
Rice	3	1	2	3			1										1	1
Faribault	**2**	**1**	**1**	**2**			**1**										**1**	
Roseau	2	1	1	2						1			1					
St. Louis	8	4	4	8				3	1						2	1		1
Virginia	**1**	**1**		**1**					**1**									
Duluth	**3**	**1**	**2**	**3**				**1**								**1**		**1**
Scott	3	3		3				1		2								
Sherburne	2	2		2								1						1
Sibley	2	2		2					1									1
Stearns	4	1	3	4				1			1				1			1
St. Cloud	**1**	**1**		**1**							**1**							
Steele	1	1		1						1								
Waseca	5	2	3	5			2	1				1				1		
Washington	1		1	1													1	
Watonwan	4	3	1	4			1		1		1							1
Winona	3	2	1	3				1					1				1	
Winona	**2**	**2**		**2**				**1**									**1**	
Wright	2		2	2					1					1				
Total	151	79	72	150	1		13	17	12	14	10	7	5	5	7	11	22	28

BRONCHITIS (ACUTE) IN 1910

Age													Conjugal Cond.				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid	Not Given	Minn.	Other U. S.	Foreign	Not Given
1													1				1			
		1											1				1			
		1											1				1			
1													1				1			
2		1											3				3			
2		1											3				3			
2	1												3				3			
1													1				1			
2													2				2			
2													2				2			
3													3				3			
1													1				1			
										1					1				1	
1		1							1	1			2	1	1		2		2	
		1							1	1			1	1	1		1		2	
										1				1					1	
1													1				1			
2									1				3				2		1	
3													3				3			
											1				1				1	
13									4	3	2		13	5	4		11	6	5	
11									4	3	2		11	5	4		9	6	5	
1								1			1		1	1	1		1	1	1	
1											1		1	1			1		1	
4													4				4			
		1											1				1			
		1								1	2		1		3		1		3	
2			1										3				3			
1											2		1		2		1	2		
1													1				1			
											1				1			1		
1													1				1			
					1					1			1		1		1		1	
1													1				1			
	1										2		1	1	1		1	1	1	
	1										1		1	1			1		1	
											1				1				1	
1											1		2				1	1		
1		1							1		1		2		2		2	2		
									1						1			1		
3	1												4				4			
1													1				1			
8	2	1	1		2						1		13	1	1		10	4		1
6	2	1	1		2								11	1			8	4		
2				1						1	1		3		2		3		2	
1			1								1		2		1		2		1	
			1								1		1		1		1		1	
		1								1			1		1		1		1	
5			1						1	1			6		2		6	1	1	
1													1				1			
2									1				2		1		2		1	
										1	2				3				3	
2													2				2			
2													2				2			
1			1								2		2		2		2		2	
			1										1				1			
1													1						1	
2	1	1									1		4		1		4			1
		1											1				1			
										2	2			3	1			1	3	
2											1		2		1		2		1	
2													2				2			
1										1			1		1		1	1		
76	6	10	5	1	3			1	8	15	26		102	11	35		91	21	36	1

TABLE XIV—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Anoka	3	2	1	3							1					1	1	
Becker	1		1	1							1							
Benton	1	1		1				1										
Blue Earth	1	1		1			1											
Brown	1		1	1														1
New Ulm	**1**		**1**	**1**														**1**
Carlton	1	1		1				1										
Carver	1		1	1				1										
Chisago	1		1	1														1
Clay	2		2	2			1										1	
Douglas	2		2	2								1				1		
Fillmore	1		1	1							1							
Freeborn	2	2		2					1								1	
Goodhue	2	1	1	2					1	1								
Red Wing	**2**	**1**	**1**	**2**					**1**	**1**								
Hennepin	9	2	7	9			2		2		3			1			1	
Minneapolis	**5**	**2**	**3**	**5**			**1**				**3**			**1**				
Houston	1	1		1													1	
Hubbard	1	1		1														1
Isanti	2	2		2												1		1
Kittson	1		1	1													1	
Le Sueur	1		1	1								1						
Lincoln	1	1		1											1			
Marshall	1		1	1							1							
Mower	1	1		1														1
Austin	**1**	**1**		**1**														**1**
Nobles	1		1	1						1								
Olmsted	1	1		1			1											
Otter Tail	2		2	2				1			1							
Polk	1	1		1													1	
Crookston	**1**	**1**		**1**													**1**	
Ramsey	11	6	5	11			4	1	1		2	2					1	
St. Paul	**11**	**6**	**5**	**11**			**4**	**1**	**1**		**2**	**2**					**1**	
Red Lake	1		1	1												1		
Redwood	1	1		1													1	
Renville	1	1		1				1										
Rock	1	1		1											1			
Roseau	1	1		1					1									
St. Louis	1	1		1					1									
Scott	2	2		2			1				1							
Stearns	2	1	1	1	1					1							1	
Steele	2	1	1	2							1							1
Swift	1	1		1									1					
Todd	1		1	1							1							
Wabasha	2	2		2			1						1					
Waseca	3	1	2	3								1					1	1
Washington	1	1		1			1											
Winona	1	1		1							1							
Yellow Medicine	2	1	1	1		1		2										
Total	76	40	36	74	1	1	12	8	7	3	14	5	2	1	2	4	11	7

BRONCHITIS (CHRONIC) IN 1910

Age													Conjugal Cond.				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid.	Not Given	Minn.	Other U. S.	Foreign	Not Given
										2	1		1	1	1			1	2	
										1					1				1	
											1				1				1	
										1					1				1	
									1						1				1	
									1						1				1	
										1				1				1		
						1								1					1	
								1					1						1	
								1			1			1	1				2	
									1	1					2				2	
									1					1				1		
										2				1	1			1	1	
								1		1			1		1				2	
								1		1			1		1				2	
						1			2	3	3		1	2	6			4	4	1
						1			2	2			1	1	3			2	2	1
									1					1					1	
1													1				1			
								1			1				2				2	
											1				1					
	1												1				1			
										1					1				1	
											1				1				1	
									1					1				1		
									1					1				1		
				1									1					1		
										1				1					1	
									1	1					2				2	
										1					1				1	
										1					1				1	
					1			1	2	5	2		1	2	8			1	10	
					1			1	2	5	2		1	2	8			1	10	
										1				1					1	
										1				1					1	
										1				1					1	
									1				1					1		
											1			1					1	
	1												1				1			
										2				2					2	
									1	1				1		1			1	1
										1	1			1	1			1	1	
								1						1					1	
										1				1					1	
							1				1			1	1			1	1	
										3				1	2				3	
										1					1				1	
					1								1						1	
										1	1			1	1		1		1	
1	2	..		1	2	2	1	6	12	34	15	..	11	26	38	1	4	15	55	2

TABLE XV—DEATHS FROM CANCER IN 1910

COUNTY	To-tal	Sex		Color			Month of Death												Age									
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70
Aitkin	10	7	3	9	1			1	1			1	1	2	1		1	2								1	3	4
Anoka	8	3	5	8									1	1	3	1		2								1	2	2
Becker	7		7	7				1		1	2	1				2										2	1	4
Beltrami	5	5		5			1					1		1	1	1										1	1	1
Bemidji	3	3		3										1	1	1										1	1	1
Benton	5	2	3	5						1			1		1	1		1					1			2		1
Big Stone	5	3	2	5				2		1			1	1													3	2
Blue Earth	33	18	15	33			1	1	1	2	4	5	5	2	1	3	6	2						1		5	4	9
Mankato	17	7	10	17			1	1		1	2	3	3	1		1	3	1						1		3	2	5
Brown	13	5	8	13			2	1	1		1	1	3	2			1	1								2	2	6
New Ulm	4	3	1	4					1		1		1	1												1		2
Carlton	6	4	2	6			1	1				2	1	1													2	4
Cloquet	2	2		2								1	1														1	1
Carver	7	5	2	7						2	1		1	1		1	1										1	2
Cass	5	1	4	5			1						1			1	2									1	3	1
Chippewa	13	7	6	13				1	1	1	2	3	1	2	1	1								1		1	4	2
Chisago	14	8	6	14			1	1	2	2	2	1	2			1		2							1	2	1	6
Clay	11	9	2	11			2		2	2		1			2			2			1						6	2
Clearwater	4	2	2	4					1	1	1						1									1	2	1
Cottonwood	8	3	5	8				2			1	1	1	1			1	1							3		1	1
Crow Wing	11	5	9	14			2	4			2	1	1	2		1	1							1	1	3	6	2
Brainerd	9	3	6	9			2	3			1	1	1	1										1		2	4	1
Dakota	27	10	17	27			1	2	3	3	4	1	3	2	2	4	1	1						1		5	5	7
Dodge	14	6	8	14			1		3	2		1	4		1	2										1	5	3
Douglas	13	4	9	13			3		2		1	1		1	1		3	1								1	5	6
Faribault	13	5	8	13					3			2	1	2	2	2	1									1	3	4
Fillmore	18	11	7	18			1	1		3	2	1	3		1	1	3	2				1			1	3	3	3
Freeborn	20	10	10	20			3	2		3	3	1	3	1		1	2	1				1				2	3	8
Albert Lea	5	2	3	5			1				2			1			1										1	2
Goodhue	22	9	13	22			3	3	1			1	1	4	1	4	1	3							1	2	6	4
Red Wing	4		4	4			2							2												1	2	
Grant	7	6	1	7			1	1					1		1	1	1	1							1		1	3
Hennepin	220	106	114	219	1		10	28	16	12	20	18	18	27	14	20	15	22			3			3	19	38	65	59
Minneapolis	204	99	105	203	1		10	26	15	12	18	16	15	25	14	19	13	21			3			3	15	34	61	57
Houston	11	3	8	11			3	1	1	1			2	2	1										1		1	5
Hubbard	3	1	2	3					1				1	1									1				2	
Isanti	6	3	3	6			1	1			2			1	1										1	1	1	1
Itasca	3	1	2	3						1		1				1										2	1	
Jackson	15	7	8	15				1	2	3		1	2	2		2	1	1							2	1	2	4

TABLE XV—DEATHS FROM CANCER IN 1910—Continued

COUNTY	Age			Conjugal Cond.				Birth Place				Occupation																			
	70 to 80	Over 80	Not Given	Single	Married	D. & W.	Not Given	Minn.	U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Wood-worker	Woods-man	Ry.	Profes-sional	Me-chanic	Mason	Painter	Agent	Engin-eer	Bar & Hotel	Miner	Miscel-laneous
Aitkin	1	1			7	3			1	9		3	6										1								
Anoka	1	2			4	4		1	2	5		6	1	1																	
Becker					7				2	5		7																			
Beltrami	2			2	1	2		1	1	2	1	1	1	1													1	1			
Bemidji				**2**		**1**		**1**		**1**	**1**	**1**															**1**	**1**			
Benton	1			1	3	1		1		4		4	1																		
Big Stone					2	3			1	4		3	2																		
Blue Earth	9	5		3	19	11		3	7	22	1	22	5	1				1	1	1				1			1				
Mankato	**4**	**2**		**2**	**10**	**5**		**3**	**2**	**12**		**12**	**1**					**1**	**1**	**1**				**1**							
Brown	2	1		1	7	5		2		11		11		1											1						
New Ulm	**1**			**1**	**1**	**2**				**4**		**2**		**1**											**1**						
Carlton				1	4	1				6		2	1	1						1			1								
Cloquet					**2**					**2**				**1**						**1**											
Carver	4				7					7		7																			
Cass					3	2			2	3		4	1																		
Chippewa	5				10	2	1	1	2	10		9	3					1													
Chisago	4			2	10	2				14		9	4	1																	
Clay	1	1		2	9			1		9	1	5	3	1	1														1		
Clearwater					1				1	3		2	1						1												
Cottonwood	3				6	2		1	3	3	1	6	2																		
Crow Wing		1		2	7	3	2		4	9	1	8	3		1							1	1								
Brainerd		**1**		**2**	**3**	**2**	**2**		**3**	**5**	**1**	**6**	**1**		**1**							**1**									
Dakota	7	2		4	19	4		2	9	15	1	20	3			1				1			1			1					
Dodge	1	1		1	11	2			8	6		11	3																		
Douglas	1			1	9	3			3	10		9	4																		
Faribault	4	1			7	5	1			13		11	1			1															
Fillmore	7			4	9	5		3	4	11		11	6										1								
Freeborn	5	1		1	11	5		1	6	13		13	5					1								1					
Albert Lea	**2**				**4**	**1**			**2**	**3**		**4**														**1**					
Goodhue	8	1		1	15	6		5	2	15		15	5					1													1
Red Wing	**1**			**1**	**2**	**1**		**3**	**1**			**4**																			
Grant	1	1			5	2			3	4		4	1	1									1								
Hennepin	23	10		22	146	51	1	16	79	118	7	140	9	8	3	4	3	4	4	8		1	2	5	2		2				25
Minneapolis	**21**	**10**		**21**	**132**	**50**	**1**	**13**	**74**	**110**	**7**	**129**	**8**	**8**	**3**	**4**	**3**	**4**	**4**	**8**		**1**	**2**	**4**	**1**						**25**
Houston	4				8	3			1	10		6	3	1																	1
Hubbard				1	1	1			3			3																			
Isanti	2			2	3	1			2	4		4	1																		1
Itasca					2	1				3		2																		1	
Jackson	4	2			10	5		1	6	8		12	1		1								1								

TABLE XV—DEATHS FROM CANCER IN 1910—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age									
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70
Kanabee	3	3		3							2		1														1	
Kandiyohi	17	7	10	17				1	1	2	2	1	2	4	1	1	1	1								1	3	8
Kittson	1	1		1									1															
Koochiching	3	2	1	3			1		1			1															1	1
Lac qui Parle	4	4		4				1	1					1	1												1	1
Lake	4	1	3	4			1							2	1												2	1
Le Sueur	9	4	5	9			1			1			1	1		1	2	2						1		1	2	
Lincoln	5	4	1	5						2		1					2						1				1	1
Lyon	10	7	3	10			2				2	1		3	1	1										1	4	4
McLeod	14	5	9	11				2	2	1	1		2		2	2		2								1	4	2
Mahnomen	1	1		1											1													1
Marshall	16	6	10	16			2	1		4	2	1	1		2	1	1	1							1	6	3	5
Martin	10	2	8	10			1		2						1	1	3	2							1	2	1	3
Meeker	13	5	8	13				2			2	1	2			1	2	3								2	3	3
Mille Lacs	4	2	2	4					1				1	1	1													1
Morrison	8	5	3	8			2	1						1	1	1	1	1								2	3	2
Little Falls	2	1	1	2			1								1											1		
Mower	17	7	10	17			1	1		1	2	5	1		3	2		1					1	1	2	1	1	6
Austin	3	1	2	3								1	1		1								1			1		
Murray	5	4	1	5				1		1			1	1		1									1		3	
Nicollet	10	8	2	10			2	1	3						1	1	1	1					1				5	3
St. Peter	3	2	1	3					2									1					1				1	
Nobles	7	1	6	7			2			1		1		1	2									1	1	1	1	2
Norman	10	7	3	10			2		1				1	1	2		2	1					1		1		3	2
Olmsted	65	39	26	65			9	5	6	4	5	6	6	3	6	3	7	5					1		5	8	23	16
Rochester	53	33	20	53			5	5	5	2	5	5	4	3	6	2	6	5					1		5	7	21	12
Otter Tail	36	22	14	36			1		2	3	3	8	5	3	2	2	3	4				1			1	5	7	6
Fergus Falls	9	5	4	9								3	1		2		1	2							1	1	1	2
Pennington	1		1	1														1									1	
Pine	7	3	4	7					1		1		3			1		1								2	2	2
Pipestone	9	5	4	9			1	1		1	1	1	1				1	2								2	2	2
Polk	20	10	10	20			4	2	1	1		3	1	1	1	1		5								1	8	5
Crookston	3	1	2	3			1	1		1																	1	1
Pope	10	3	7	10					2		1		2	3		1	1									2	3	1
Ramsey	180	80	100	176	4		22	16	28	10	5	14	15	14	12	11	14	19						3	16	31	50	44
St. Paul	179	80	99	175	4		22	16	27	10	5	14	15	14	12	11	14	19						3	15	31	50	44
Red Lake	7	4	3	7			1	2					1	2		1										1	1	2
Redwood	3	1	2	3			2					1															2	1
Renville	5	5		5					1	1	1		1					1									1	2

TABLE XV—DEATHS FROM CANCER IN 1910—Continued

COUNTY	Age			Conjugal Cond.				Birth Place				Occupation																		
	70 to 80	Over 80	Not Given	Single	Married	D. & W.	Not Given	Minn.	U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Painter	Agent	Engineer	Bar & Hotel	Miner	Mi[illegible] laneou
Kanabee		2			1	2			1	2		2	1																		
Kandiyohi	4	1		2	12	3			3	14		13	2	1									1								
Kittson	1				1					1		1																			
Koochiching	1			1	1	1			1	2		2								1											
Lac qui Parle	2			1	3				1	3		3	1																		
Lake	1				3	1			1	3		3									1										
Le Sueur	4	1		1	4	4		2		7		7	1												1						
Lincoln	1	1		2	3			1		4		4	1																		
Lyon		1		1	7	2			3	7		4	4						1			1									
McLeod	5	2			9	5			5	9		13	1																		
Mahnomen					1				1				1																		
Marshall		1			12	4		2	2	12		10	4	1						1											
Martin	2	1			6	1				8	2	9	1																		
Meeker	5				8	5			4	9		11	2																		
Mille Lacs	1	2		2	1	1			2	2		3															1				
Morrison	1				8				3	5		3	4			1															
Little Falls	**1**				**2**				**1**	**1**		**1**	**1**																		
Mower	3	2		2	10	4	1	2	7	8		13	3	1																	
Austin	**1**			**1**	**2**				**2**	**1**		**3**																			
Murray	1			2	2	1				5		1	2	2																	
Nicollet		1		2	8			2		8		5	4							1											
St. Peter		**1**		**2**	**1**			**1**		**2**		**3**																			
Nobles		1		1	5	1			2	5		6	1																		
Norman	2	1		2	5	3		1	1	8		6	3																		1
Olmsted	8	4		11	42	10	2	4	31	25	5	35	14	1	1	1	2		5	1			2	1			2				
Rochester	**5**	**2**		**9**	**34**	**8**	**2**	**4**	**25**	**20**	**4**	**25**	**13**		**1**	**1**	**2**		**5**	**1**			**2**	**1**			**2**				
Otter Tail	13	3		6	21	9		2	6	28		26	8	2																	
Fergus Falls	**3**	**1**		**1**	**5**	**3**			**1**	**8**		**7**	**2**																		
Pennington						1				1		1																			
Pine		1		1	4	2			1	6		4	2																		1
Pipestone	2	1			6	3			5	4		7													2						
Polk	3	3		2	13	5			1	19		12	6					1							1						
Crookston	**1**				**2**	**1**				**3**		**2**													**1**						
Pope	3	1			8	2			2	8		8	2																		
Ramsey	30	6		23	108	16	3	9	56	113	2	124	7	10	4		2	5		7		2	2		2		2		2		11
St. Paul	**30**	**6**		**23**	**107**	**46**	**3**	**8**	**56**	**113**	**2**	**123**	**7**	**10**	**4**		**2**	**5**		**7**		**2**	**2**		**2**		**2**		**2**		**11**
Red Lake	3				5	2			3	4		5	1						1												
Redwood					3				1	2		2	1																		
Renville	2				5					5		2	3																		

TABLE XV—DEATHS FROM CANCER IN 1910—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age									
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70
Rice	24	14	10	24	....	....	2	1	2	2	5	1	1	....	3	2	1	4	....	....	....	....	....	....	....	3	3	7
Faribault	**7**	**3**	**4**	**7**	....	....	....	....	**1**	....	**1**	**1**	....	....	**1**	**1**	....	**2**	....	....	....	....	....	....	....	**2**	**1**	**3**
Rock	3	....	3	3	....	....	....	....	....	....	....	....	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	1
Roseau	3	2	1	3	....	....	....	1	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	2	....
St. Louis	66	34	32	66	....	....	5	5	6	8	2	5	8	10	3	4	4	6	....	....	....	....	2	1	4	18	18	18
Hibbing	**1**	**1**	....	**1**	....	....	....	....	**1**	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	**1**
Virginia	**2**	**1**	**1**	**2**	....	....	....	....	....	....	....	**1**	....	**1**	....	....	....	....	....	....	....	....	....	....	....	**1**	....	**1**
Duluth	**49**	**23**	**26**	**49**	....	....	**3**	**4**	**5**	**7**	**1**	**1**	**5**	**9**	**3**	**4**	**3**	**4**	....	....	....	....	**1**	**1**	**3**	**14**	**14**	**13**
Scott	16	8	8	16	....	....	2	1	....	2	1	2	2	1	1	2	....	2	....	....	....	....	....	....	....	2	3	4
Sherburne	3	2	1	3	....	....	....	....	....	....	1	....	1	....	1	....	....	....	....	....	....	....	....	....	1	....	1	....
Sibley	9	6	3	9	....	....	1	....	....	2	....	1	....	....	....	3	2	....	....	....	....	....	....	....	....	1	1	2
Stearns	31	18	13	31	....	....	4	3	1	1	2	2	3	1	5	4	1	4	....	1	....	....	....	1	....	1	10	9
St. Cloud	**12**	**8**	**4**	**12**	....	....	**3**	....	....	**1**	**1**	....	**1**	....	**2**	**2**	**1**	**1**	....	....	....	....	....	**1**	....	**1**	**6**	**3**
Steele	16	9	7	16	....	....	1	1	3	1	1	1	1	2	1	2	1	1	1	....	....	....	....	....	....	....	3	2
Owatonna	**10**	**5**	**5**	**10**	....	....	**1**	**1**	**2**	**1**	....	**1**	**1**	**1**	....	**1**	....	**1**	**1**	....	....	....	....	....	....	....	**1**	**1**
Stevens	6	3	3	6	....	....	....	....	....	2	1	....	....	1	....	1	1	....	....	....	....	....	....	....	....	....	3	2
Swift	5	2	3	5	....	....	....	....	1	2	....	....	1	....	1	....	....	....	....	....	....	....	....	....	1	1	....	....
Todd	16	9	7	16	....	....	....	1	4	....	....	2	2	3	....	2	1	1	....	....	....	1	....	....	2	....	5	6
Traverse	3	3	....	3	....	....	....	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1
Wabasha	14	8	6	14	....	....	1	1	....	1	2	2	2	....	2	2	1	....	....	....	....	....	....	....	....	1	1	5
Wadena	5	4	1	5	....	....	1	....	....	....	....	1	....	....	1	1	1	....	....	....	....	....	....	....	....	....	1	3
Waseca	9	5	4	9	....	....	1	1	1	....	2	....	....	3	....	....	....	1	....	....	....	....	....	....	....	1	2	1
Washington	22	14	8	22	....	....	....	1	1	4	1	2	1	3	3	2	2	2	....	....	....	....	....	....	2	2	3	9
Stillwater	**8**	**5**	**3**	**8**	....	....	....	**1**	....	**1**	....	**1**	**1**	....	**1**	**1**	**1**	**1**	....	....	....	....	....	....	**1**	....	**2**	**2**
Watonwan	3	1	2	3	....	....	....	....	....	....	1	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	1	1
Wilkin	6	4	2	6	....	....	....	....	....	....	2	....	....	....	1	2	1	....	....	....	....	....	....	....	....	....	3	3
Winona	23	14	9	23	....	....	2	2	....	1	....	1	1	4	3	3	5	1	....	....	....	....	1	1	....	3	3	9
Winona	**13**	**8**	**5**	**13**	....	....	**1**	....	....	....	....	**1**	**1**	**3**	**1**	**2**	**3**	**1**	....	....	....	....	**1**	**1**	....	....	**2**	**5**
Wright	19	8	11	19	....	....	....	....	3	3	2	1	....	6	2	2	....	....	....	....	....	....	....	....	1	2	4	7
Yellow Medicine	9	5	4	9	....	....	....	....	2	1	....	....	1	....	1	....	1	3	....	....	....	....	....	....	1	1	3	2
Total	1385	700	685	1379	6	....	115	110	119	105	101	112	135	136	105	117	107	123	1	1	4	3	10	16	70	186	357	374

TABLE XV—DEATHS FROM CANCER IN 1910—Continued

COUNTY	Age			Conjugal Cond.				Birth Place				Occupation																			
	70 to 80	Over 80	Not Given	Single	Married	D. & W.	Not Given	Minn.	U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Painter	Agent	Engineer	Bar & Hotel	Miner	Miscellaneous
Rice	8	3	....	4	15	5	....	2	12	10	....	17	5	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1
Faribault	1	....	....	2	4	1	....	1	4	2	....	5	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Rock	1	1	....	....	2	1	....	....	2	1	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Roseau	....	1	....	....	2	1	....	....	....	3	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
St. Louis	5	....	....	11	43	11	1	4	12	50	....	35	12	7	1	3	....	2	2	1	....	4	1	....	....	....	....	....	1	1	6
Hibbing	....	....	....	....	1	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Virginia	....	....	....	....	1	1	....	....	....	2	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Duluth	3	....	....	8	32	8	1	3	10	36	....	26	....	3	1	2	....	2	2	1	....	3	1	....	....	....	....	....	1	1	6
Scott	4	3	....	....	10	6	....	3	1	12	....	12	2	....	....	....	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....
Sherburne	1	....	....	....	2	1	....	....	2	1	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sibley	3	2	....	1	5	3	....	1	1	7	....	7	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Stearns	6	3	....	3	18	10	....	3	9	19	....	19	7	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	3
St. Cloud	1	....	....	1	8	3	....	2	4	6	....	6	2	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	2
Steele	8	2	....	2	9	5	....	2	6	8	....	14	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Owatonna	5	2	....	2	5	3	....	1	5	4	....	9	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Stevens	1	....	....	....	3	3	....	1	1	4	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Swift	3	....	....	....	4	1	....	....	1	4	....	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Todd	1	1	....	1	10	5	....	3	6	7	....	10	4	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Traverse	1	....	....	....	2	1	....	....	....	3	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wabasha	5	2	....	2	8	4	....	....	3	11	....	11	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wadena	1	....	....	....	4	1	....	....	3	2	....	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Waseca	5	....	....	....	5	1	....	....	3	6	....	8	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Washington	6	2	....	2	16	3	1	1	4	16	1	17	3	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Stillwater	2	1	....	1	5	1	1	....	....	7	1	7	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Watonwan	....	1	....	....	1	2	....	....	1	2	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wilkin	....	....	....	1	4	1	....	....	....	5	1	2	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Winona	3	3	....	3	15	5	....	3	6	14	....	17	5	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Winona	2	2	....	2	8	3	....	2	3	8	....	11	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wright	5	....	....	1	11	7	....	2	6	11	....	14	3	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....
Yellow Medicine	....	2	....	1	4	4	....	1	....	8	....	4	4	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total	268	95	....	141	885	343	13	90	374	897	24	920	212	45	13	12	7	17	15	25	1	9	18	8	10	2	11	1	5	2	52

TABLE XVI—DEATHS FROM DIARRHOEAL DISEASES

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	9	6	3	9						1	2			1	4	1		
Anoka	5	3	2	5					1			1	1	1		1		
Becker	19	10	9	19				1	1	1				8	4	3		1
Beltrami	24	14	10	24					2			2	2	9	5	2		2
Bemidji	**7**	**5**	**2**	**7**								**1**	**2**	**4**				
Benton	20	8	12	20			1	1		2		1	2	8	3	2		
Big Stone	7	2	5	7										2	4	1		
Blue Earth	7	4	3	7										3	3	1		
Mankato	**5**	**2**	**3**	**5**										**2**	**2**	**1**		
Brown	14	7	7	14							1		3	1	4	4		1
New Ulm	**5**	**3**	**2**	**5**							**1**		**1**			**2**		**1**
Carlton	27	15	12	17			1		2		1		5	10	6	2		
Cloquet	**11**	**6**	**5**	**11**					**2**				**2**	**6**	**1**			
Carver	4	3	1	4					1		1				1			1
Cass	4	3	1	4									1	2	1			
Chippewa	8	5	3	8					1	1				3	2	1		
Chisago	4	4		4						1				2				1
Clay	11	8	3	11			1							9	1			
Clearwater	7	3	4	7								2		1	2		1	1
Cottonwood	11	8	3	11								1		4	3	3		
Crow Wing	21	10	11	21			1		1	1		1	2	9	4	2		
Brainerd	**17**	**8**	**9**	**17**			**1**		**1**	**1**		**1**	**1**	**8**	**3**	**1**		
Dakota	12	9	3	12					1	1	2			5	2	1		
Dodge	5	5		5											1	1	2	1
Douglas	10	2	8	10			1		1					1	6	1		
Faribault	9	5	4	9					1			2		3	1	1	1	
Fillmore	13	11	2	13				1		1		2	1	2	3	3		
Freeborn	10	5	5	10						1		1		1	4	1	1	1
Albert Lea	**4**	**2**	**2**	**4**								**1**		**1**	**2**			
Goodhue	16	10	6	16			3	1		1		2	3	2	4			
Red Wing	**4**	**2**	**2**	**4**									**2**	**1**	**1**			
Grant	4	3	1	4								1				3		
Hennepin	274	142	132	273	1		12	10	8	11	6	18	56	68	33	26	14	12
Minneapolis	**261**	**133**	**128**	**260**	**1**		**11**	**10**	**8**	**11**	**5**	**17**	**56**	**62**	**31**	**25**	**13**	**12**
Houston	5	2	3	5			1				1			1	1	1		
Hubbard	6	2	4	6									1	1	4			
Isanti	10	5	5	10				1		1	1			5		1	1	
Itasca	23	15	8	23						2	1	2	6	10	2			
Jackson	9	6	3	9								2	1	2	2			2
Kanabec	3	1	2	3								1						2
Kandiyohi	5	5		5				1				2		1		1		
Kittson	11	5	6	11				1		1	1			3	4	1		
Koochiching	4	1	3	4			1							2			1	
Lac qui Parle	11	4	7	11				1	1	1	1	1	1	2	1	2		
Lake	7	4	3	7					1			1		5				
Le Sueur	6	4	2	6							1		1	2	2			
Lincoln	8	4	4	8						1			1	2	2	2		
Lyon	14	8	6	14			1					1		4	7		1	
McLeod	10	6	4	10					1			1	1	1	3	1	2	
Marshall	16	9	7	16			1	2	1						6	4	2	
Martin	7	5	2	7			1						1	1	1	2	1	
Meeker	11	7	4	11				1	1			1	1	1	3	3		
Mille Lacs	10	8	2	10			1	1			1			1	4	2		
Morrison	16	9	7	16				1	1	1			1	6	3	1	2	
Little Falls	**6**	**3**	**3**	**6**					**1**					**2**	**1**		**2**	
Mower	7	5	2	7				1						3	1	2		
Austin	**2**	**2**		**2**				**1**								**1**		
Murray	4	1	3	4										3	1			
Nicollet	5	2	3	5									2	1	1			1
St. Peter	**1**		**1**	**1**										**1**				
Nobles	10	8	2	10								1	4	3	2			
Norman	11	6	5	11				3			2			3	3			
Olmsted	9	3	6	9			2	2			2			1	1			1
Rochester	**3**	**1**	**2**	**3**			**1**	**1**			**1**							
Otter Tail	34	19	15	34			1	2	1				4	7	9	8	2	
Fergus Falls	**2**	**1**	**1**	**2**			**1**									**1**		
Pine	11	6	5	10		1		1			1	1	1	2	2	2	1	
Pipestone	5	4	1	5			2				1			2				
Polk	33	19	14	33			1		2	1	2	3	2	5	11	3	2	1
Crookston	**8**	**4**	**4**	**8**										**2**	**3**	**2**	**1**	
Pope	13.	8	5	13						1				8	2	2		

OF CHILDREN UNDER TWO YEARS OF AGE IN 1910

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W & D	Not Given	Minn	Other U. S.	Foreign	Not Given
9	...	...											9				9			
4	1	...											5				5			
16	3												19				17	2		
21	3												24				22	2		
7													7				7			
18	2												20				20			
6	1												7				6	1		
6	1												7				6	1		
4	1												5				5			
13	1												14				14			
5													5				5			
16	11												27				27			
6	5												11				11			
2	2												1				4			
3	1												4				3	1		
6	2												8				8			
2	2												4				4			
8	3												11				9	2		
4	3												7				7			
9	2												11				11			
14	7												21				19	1	1	
12	5												17				16		1	
12													12				11		1	
3	2												5				5			
9	1												10				10			
6	3												9				9			
6	7												13				13			
7	3												10				10			
3	1												4				4			
14	2												16				16			
4													4				4			
4													4				4			
235	39												274				253	17	4	
225	**36**												**261**				**241**	**16**	**4**	
5													5				5			
5	1												6				6			
9	1												10				10			
19	4												23				22	1		
9													9				9			
2	1												3				3			
5													5				5			
8	3												11				10	1		
4													4				4			
9	2												11				10	1		
4	3												7				6	1		
4	2												6				6			
8													8				6	2		
13	1												14				14			
8	2												10				10			
15	1												16				15	1		
5	2												7				7			
8	3												11				10	1		
8	2												10				10			
10	6												16				16			
4	2												6				6			
6	1												7				7			
2													2				2			
3	1												4				1			
4	1												5				5			
1													1				1			
9	1												10				9	1		
11	...												11				10	1		
8	1												9				8	1		
3													3				2	1		
23	11												31				33	1		
2													2				2			
10	1												11				11			
5													5				1	1		
28	5												33				32	1		
8													8				8			
9	4												13				13			

TABLE XVI—DEATHS FROM DIARRHOEAL DISEASES OF

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Ramsey	189	108	81	189			6	5	8	9	11	22	29	39	29	12	12	7
St. Paul	**180**	**101**	**79**	**180**			**6**	**5**	**8**	**8**	**9**	**21**	**28**	**38**	**27**	**11**	**12**	**7**
Red Lake	9	7	2	9					1			1		2	4	1		
Redwood	7	5	2	7							1		1	3		1		1
Renville	17	7	10	17				3	1			2	3	6	1	1		
Rice	11	7	4	11						2			1	3	3	1		1
Faribault	**3**	**3**		**3**											**2**			**1**
Rock	6	3	3	6							1	1	1	3				
Roseau	7	4	3	7										3	3		1	
St. Louis	281	155	126	281			5	6	11	7	16	13	42	97	40	18	10	16
Hibbing	**22**	**11**	**11**	**22**			**1**			**1**		**2**	**3**	**8**	**2**	**3**		**2**
Virginia	**19**	**9**	**10**	**19**					**1**	**3**	**1**		**4**	**4**	**4**	**1**		**1**
Eveleth	**16**	**11**	**5**	**16**							**1**		**4**	**2**	**4**	**2**	**2**	**1**
Duluth	**106**	**56**	**50**	**106**			**1**	**2**	**6**	**1**	**8**	**6**	**11**	**43**	**16**	**5**	**4**	**3**
Scott	3		3	3										1	1	1		
Sherburne	4	3	1	4			1					1			1	1		
Sibley	8	4	4	8					1				2		2	1	2	
Stearns	37	26	11	37			3		1	1	2	1	3	6	10	5	3	2
St. Cloud	**9**	**6**	**3**	**9**							**1**		**1**	**2**	**4**		**1**	
Steele	8	3	5	8			1							2	4			1
Owatonna	**3**	**1**	**2**	**3**										**1**	**1**			**1**
Stevens	10	4	6	10			1		1					2	3	2		1
Swift	13	8	5	13							2			7		4		
Todd	7	6	1	7										4		2	1	
Traverse	2	2		2									1			1		
Wabasha	6	4	2	6					1		1	1			3			
Wadena	8	3	5	8					1					4	1	2		
Waseca	13	7	6	13					1				2	5	2	2		
Washington	7	3	4	7			1							4	1	1		
Stillwater	**3**	**2**	**1**	**3**										**2**		**1**		
Watonwan	3	2	1	2									1		2			
Wilkin	10	6	4	10			1			1				3	3	1	1	
Winona	20	13	7	20				2	2			1	6	5	1		1	2
Winona	**16**	**10**	**6**	**16**				**2**	**2**			**1**	**5**	**4**			**1**	**1**
Wright	14	7	7	14			1		1		1			2	2	4	2	1
Yellow Medicine	5	4	1	5										2	1		2	
Total	1594	897	697	1592	1	1	52	48	59	51	63	95	196	446	296	159	69	60

CHILDREN UNDER TWO YEARS OF AGE IN 1910—Continued

Age													Conjugal Cond				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
163	26												189				128	61		
156	24												180				120	60		
9													9				9			
7													7				7			
15	2												17				16	1		
10	1												11				11			
3													3				3			
6													6				5	1		
6	1												7				7			
231	56												281				265	14	2	
18	4												22				21	1		
13	6												19				18	1		
12	4												16				15	1		
89	17												106				103	3		
1	2												3				3			
4													4				4			
7	1												8				8			
34	3												37				36		1	
9													9				9			
6	2												8				8			
3													3				3			
16													10				10			
11	2												13				13			
6	1												7				7			
2													2				2			
6													6				6			
5	3												8				8			
12	1												13				13			
6	1												7				6		1	
2	1												3				3			
2	1												3				3			
9	1												10				9	1		
12	8												20				19	1		
10	6												16				15	1		
12	2												14				11			
5													5				5			
1324	270												1594				1513	41	10	

TABLE XVII—DEATHS FROM DIARRHOEAL DISEASES OF

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	2		2	2										1	1			
Anoka	1		1	1														1
Becker	2		2	2					1					1				
Beltrami	4	1	3	4									1	3				
Benton	2	2		2										1		1		
Big Stone	2	2		2										1	1			
Blue Earth	2	2		2					1							1		
Mankato	**1**	**1**		**1**					**1**									
Brown	1		1	1													1	
New Ulm	**1**		**1**	**1**													**1**	
Carlton	4	3	1	4						1		1		1	1			
Cloquet	**1**	**1**		**1**						**1**								
Cass	1	1		1										1				
Chippewa	1		1	1											1			
Clearwater	2	2		2				1							1			
Cottonwood	3	1	2	3									1	1	1			
Crow Wing	7	5	2	7								1	1	2	3			
Brainerd	**4**	**2**	**2**	**4**									**1**	**1**	**2**			
Dodge	2	2		2										2				
Douglas	1	1		1											1			
Faribault	2	2		2											1	1		
Fillmore	5	4	1	5									1	2		1	1	
Freeborn	2	1	1	2										1	1			
Goodhue	1	1		1				1										
Grant	3	2	1	3										1	1	1		
Hennepin	22	10	12	22					1	1			5	11	1	1	1	1
Minneapolis	**18**	**8**	**10**	**18**					**1**	**1**			**5**	**8**	**1**	**1**	**1**	
Houston	2	2		2										1		1		
Isanti	1		1	1				1										
Lac qui Parle	5	2	3	5			1						1		1	1	1	
Lake	1		1	1										1				
Le Sueur	5	3	2	5										3	1	1		
Lincoln	1		1	1						1								
Lyon	3	2	1	3									1		2			
Marshall	1	1		1										1				
Martin	1		1	1											1			
Meeker	2	1	1	2										1	1			
Mille Lacs	2	1	1	2											1	1		
Morrison	4	3	1	4									1	1	1	1		
Little Falls	**2**	**2**		**2**									**1**			**1**		
Mower	5	2	3	5									1	3	1			
Murray	2	2		2				1						1				
Nicollet	1		1	1													1	
Nobles	1	1		1												1		
Olmsted	6	1	5	6							1		1	2	2			
Rochester	**2**		**2**	**2**							**1**				**1**			
Otter Tail	10	8	2	10										5	3	1	1	
Fergus Falls	**1**	**1**		**1**											**1**			
Polk	2	2		2											1	1		
Pope	1		1	1											1			
Ramsey	11	7	4	11			1				1	2		3			1	3
St. Paul	**10**	**6**	**4**	**10**			**1**				**1**	**2**		**2**			**1**	**3**
Redwood	1	1		1										1				
Renville	1		1	1													1	
Rice	1		1	1							1							
Rock	3	2	1	3				1							1	1		
Roseau	1		1	1				1										
St. Louis	26	16	10	26				2		2		4	5	6	3	4		
Hibbing	**6**	**5**	**1**	**6**								**3**	**2**	**1**				
Virginia	**3**	**1**	**2**	**3**						**1**		**1**				**1**		
Eveleth	**2**	**2**		**2**											**1**	**1**		
Duluth	**6**	**4**	**2**	**6**									**1**	**2**	**1**	**2**		
Scott	1		1	1											1			
Stearns	6	4	2	6						1			1		3	1		
Steele	4	3	1	4							1			3				
Owatonna	**2**	**2**		**2**										**2**				
Stevens	1		1	1										1				
Swift	2	1	1	2					1				1					
Todd	2		2	2										2				
Traverse	1	1		1										1				
Wabasha	3		3	3										2	1			
Wadena	2		2	2			1									1		
Waseca	1		1	1				1										
Wilkin	2	2		2										1	1			
Winona	2	1	1	2										1	1			
Winona	**1**		**1**	**1**											**1**			
Total	199	111	88	199	..	..	3	9	4	6	4	8	21	69	41	21	8	5

CHILDREN FROM TWO TO FIVE YEARS OF AGE IN 1910

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
		2											2				2			
		1											1				1			
		2											2				2			
		4											4				4			
		2											2				2			
		2											2				2			
		2											2				2			
		1											1				1			
		1											1				1			
		1											1				1			
		4											4				4			
		1											1				1			
		1											1				1			
		1											1				1			
		2											2				2			
		3											3				3			
		7											7				7			
		4											4				4			
		2											2				2			
		1											1				1			
		2											2				2			
		5											5				3	2		
		2											2				2			
		1											1				1			
		3											3				3			
		22											22				18	4		
		18											18				15	3		
		2											2				2			
		1											1				1			
		5											5				5			
		1											1				1			
		5											5				5			
		1											1				1			
		3											3				3			
		1											1				1			
		1											1				1			
		2											2				2			
		2											2				2			
		4											4				4			
		2											2				2			
		5											5				4	1		
		2											2				1	1		
		1											1				1			
		1											1				1			
		6											6				6			
		2											2				2			
		10											10				9	1		
		1											1				1			
		2											2				2			
		1											1				1			
		11											11				10	1		
		10											10				9	1		
		1											1				1			
		1											1				1			
		1											1				1			
		3											3				3			
		1											1				1			
		26											26				18	6	2	
		6											6				3	3		
		3											3				3			
		2											2				2			
		6											6				3	2	1	
		1											1				1			
		6											6				6			
		4											4				3	1		
		2											2				2			
		1											1				1			
		2											2				2			
		2											2				2			
		1											1				1			
		3											3				3			
		2											2				2			
		1											1				1			
		2											2				1	1		
		2											2				2			
		1											1				1			
		199											199				179	18	2	

TABLE XVIII—DEATHS FROM TYPHOID FEVER IN 1910

COUNTY	Total	Sex		Color			Month of Death												Age										
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80
Aitkin	3	3		3			1							1			1							1			1	1	
Anoka	6	5	1	6				1	1		1				1	1	1						1	4			1		
Becker	3	2		3												1	1	1				1	1	1					
Beltrami	14	12	2	14									3	2	3	2	3	1					4	5	2	2	1		
Bemidji	**8**	**8**		**8**									**1**		**1**	**2**	**3**	**1**					**1**	**4**	**1**	**1**	**1**		
Benton	1	1		1											1							1							
Big Stone	4	4		4					2			1			1								3		1				
Blue Earth	1	1		1													1									1			
Mankato	**1**	**1**		**1**													**1**									**1**			
Brown	1		1	1										1									1						
Carlton	7	5	2	7				1			1			2	1	1	1				1	1		4	1				
Cloquet	**6**	**4**	**2**	**6**							**1**			**2**	**1**	**1**	**1**				**1**	**1**		**3**	**1**				
Carver	2	2		2					1			1											1		1				
Cass	3	3		3					1								2				1		1	1					
Chippewa	1	1		1													1									1			
Chisago	3	3		3												1	2						1	1			1		
Clay	7	3	4	7						1		1		2		2	1							1	2	1			
Clearwater	4	3	1	4												1	2	1							2	2			
Cottonwood	2	2		2										2									1		1				
Cook	1	1		1											1									1					
Crow Wing	22	15	7	22			2	2	3	1		1	1			6	4	2				1	5	11	2	2	1		
Brainerd	**20**	**14**	**6**	**20**			**1**	**2**	**3**	**1**		**1**				**6**	**4**	**2**				**1**	**5**	**9**	**2**	**2**	**1**		
Douglas	2	2		2				1		1													1	1					
Fillmore	4	1	3	4				1							1		2							2	1	1			
Freeborn	1	1		1														1						1					
Goodhue	4	4		4			1	1							1			1			1			2	1				
Red Wing	**3**	**3**		**3**			**1**	**1**							**1**									**2**	**1**				
Grant	2	1	1	2											1			1							1	1			
Hennepin	187	127	60	184	3		13	33	41	27	5	2	5	10	22	11	11	7	1	2	4	6	25	78	35	25	9	2	
Minneapolis	**185**	**127**	**58**	**182**	**3**		**13**	**32**	**41**	**27**	**5**	**2**	**5**	**10**	**22**	**11**	**10**	**7**	**1**	**2**	**4**	**6**	**25**	**78**	**35**	**23**	**9**	**2**	
Hubbard	3		3	3												1	2					2					1		
Isanti	1		1	1						1														1					
Itasca	15	10	5	15									1	2	2	8	2					1	2	6	3	1	2		
Kanabec	3	2	1	3					1								2					1	1			1			
Kandiyohi	1		1	1										1									1						
Kittson	2	1	1	2						1						1					1						1		
Koochiching	4	4		4				1					1			1	1				1		1			2			
Lac qui Parle	2		2	2			1		1														1		1				
Lake	14	12	2	14					1	2		1		1	5		1						2	8	3		1		

TABLE XVIII DEATHS FROM TYPHOID FEVER IN 1910—Continued

COUNTY	Age		Conjugal Cond				Birth Place				Occupation																		
	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Painter	Bar & Hotel	Miner	Agent	Miscellaneous
Aitkin			1	2					3			2	1																
Anoka			2	4			1	1	1		1	2	2									1							
Becker			3				3				2		1																
Beltrami			11	2	1		4	1	8		3	1	2						1	3						1			
Bemidji			**7**	**1**			**3**		**4**	**1**	**1**	**2**	**1**						**1**	**3**									
Benton			1				1				1																		
Big Stone			3	1			3		1		3								1										
Blue Earth				1				1								1													
Mankato				**1**				**1**								**1**													
Brown			1				1				1																		
Carlton			4	1		2	2	1	4		3	1	2							1									
Cloquet			**3**	**1**		**2**	**1**	**1**	**4**		**3**		**2**							**1**									
Carver			1	1			2				1																		1
Cass			3				3				2						1												
Chippewa			1				1																						1
Chisago			2	1			2		1		1	2																	
Clay			1	3				2	5		2	1	2	1		1													
Clearwater			1	3				1	3		1	3																	
Cottonwood			1	1			1		1		1	1																	
Cook			1						1				1																
Crow Wing			17	4		1	8	7	5	2	10	2	4		1			1			2		1	1					
Brainerd			**15**	**4**		**1**	**8**	**6**	**4**	**2**	**10**	**1**	**3**		**1**			**1**			**2**		**1**	**1**					
Douglas			1	1			1		1										1										1
Fillmore			1	3			4				2							1								1			
Freeborn				1			1					1																	
Goodhue			3	1			2		2		1		2						1										
Red Wing			**2**	**1**			**1**		**2**				**2**						**1**										
Grant				2			1		1		1							1											
Hennepin			113	67	3	4	66	40	67	11	65	3	30	5	2	2	19	13	9		4	2	6	2		1		3	21
Minneapolis			**113**	**66**	**3**	**3**	**65**	**39**	**67**	**14**	**63**	**3**	**30**	**5**	**2**	**2**	**19**	**13**	**9**		**4**	**2**	**6**	**2**		**1**		**3**	**21**
Hubbard			2	1			2	1			3																		
Isanti				1					1		1																		
Itasca			9	5		1	4	3	5	3	1		2	1				1		2	1						2		2
Kanabec			2	1			2		1		3																		
Kandiyohi			1				1				1																		
Kittson			1	1			1		1		1	1																	
Koochiching			2	2			2		2		1		1					1								1			
Lac qui Parle			2				1		1		2																		
Lake			9	4		1			13	1	2		8						1	1				1					1

TABLE XVIII—DEATHS FROM TYPHOID FEVER IN 1910—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age										
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80
Le Sueur	2	1	1	2					1									1				1			1				
Lincoln	1		1	1				1																1					
Lyon	4		4	4											1	2		1						1	2	1			
McLeod	4	3	1	4					1	1		1			1							1	1	1		1			
Mahnomen	1	1		1														1					1						
Marshall	11	7	4	11				1	1		1			1	1	2	2	2			1		2	1	2	1	1		
Martin	2	2		2												1		1						1	1				
Mille Lacs	1	1		1										1										1					
Morrison	6	6		6			1		1	1	1						1	1			1			2	2	1			
Little Falls	4	4		4					1	1							1	1			1			1	2				
Mower	4		4	4			1						1			1	1						1	1	1	1			
Austin	3		3	3			1						1			1							1	1	1				
Nicollet	18	12	6	18			2	2		1		1		1	5	6					1			2	8	4	2	1	
St. Peter	17	11	6	17			1	2		1		1		1	5	6								2	8	4	2	1	
Nobles	1	1		1											1										1				
Norman	3	1	2	3				1		1								1					1	1	1				
Olmsted	6	2	4	6					1				1		1	2	1						2		3			1	
Rochester	3	1	2	3					1				1			1							1		1			1	
Otter Tail	23	21	2	23									2		5	10	5	1			1	2	3	8	5	3	1		
Fergus Falls	15	16		16									1		2	9	3	1				1	2	7	3	2	1		
Pennington	3	1	2	3														3				1		2					
Pine	4	2	2	4						1				1	1		1						3				1		
Polk	10	6	4	10				2			1		1			4	2			1			1	3	4	1			
Crookston	8	4	4	8				1			1		1			4	1			1			1	3	2	1			
Pope	1	1		1													1										1		
Ramsey	43	30	13	43			1	3	3	2	2	5	3	5	5	5	6	3				1	10	16	7	8		1	
St. Paul	43	30	13	43			1	3	3	2	2	5	3	5	5	5	6	3				1	10	16	7	8		1	
Red Lake	7	2	5	7			1	1	1								3	1				1	2	2	1	1			
Redwood	2	2		2														2						2					
Renville	2	2		2												1		1						1			1		
Rice	3	2	1	3				1							2								1	1			1		
Faribault	3	2	1	3				1							2								1	1			1		
Roseau	4	2	2	4								1		1	1			1			1		1	1	1				
St. Louis	128	105	23	128			1	3	6	2	2	2	3	16	31	30	17	12	2		4	2	18	64	23	6	6	2	1
Hibbing	15	11	4	15									1	2	6	5	1						2	10	2	1			
Virginia	25	21	4	25			1				1		1	5	5	7	4	1	1		1	1	3	11	5	1	2		
Eveleth	9	9		9			1				1			1	4		1	1						6	2		1		
Duluth	60	52	8	60			2	2	4	1		1		7	13	13	9	8					7	33	14	3	2	1	
Scott	1	1		1												1							1						

TABLE XVIII—DEATHS FROM TYPHOID FEVER IN 1910—Continued

COUNTY	Age		Conjugal Cond				Birth Place				Occupation																		
	Over 80	Not Given	Single	Married	W. & D	Not Given	Minn.	U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Painter	Bar & Hotel	Miner	Agent	Miscellaneous
Le Sueur			1	1			2				1	1																	
Lincoln			1				1						1																
Lyon			1	3			1	3			3			1															
McLeod			3	1			3			1	2	1							1										
Mahnomen			1					1			1																		
Marshall			7	4			5		6		4	3		1												1		1	1
Martin				2			1	1				1						1											
Mille Lacs			1					1																					1
Morrison			2	4			2	3	1		1	1		1			1											1	1
Little Falls			2	2			1	3			1			1			1												1
Mower			2	2			2	1	1		3					1													
Austin			2	1			2		1		2					1													
Nicollet			10	6	2		7	3	7	1	18																		
St. Peter			9	6	2		6	3	7	1	17																		
Nobles				1				1																1					
Norman			2	1			2		1		1		1	1															
Olmsted			5		1		1	2			2	1		3															
Rochester			2		1		2	1			1	1		1															
Otter Tail			18	5			10	2	11		16	4	2									1							
Fergus Falls			14	2			6	2	8		12	3										1							
Pennington			3				2	1	1		2		1																
Pine			3	1			3		1		3	1																	
Polk			6	4			6		3	1	3	3	1				2												1
Crookston			5	3			5		2	1	3	2	1				1												1
Pope				1																				1					
Ramsey			26	16		1	5	18	19	1	18	1	10				5	2					1						6
St. Paul			26	16		1	5	18	19	1	18	1	10				5	2					1						6
Red Lake			3	1			5	1	1		4	1				1													1
Redwood				2			1	1				1						1											
Renville			1	1					2			1															1		
Rice			2	1			2	1			1						1		1										
Faribault			2	1			2	1			1						1		1										
Roseau			2	2			3	1			3	1																	
St. Louis			92	32	2	2	14	12	96	6	25	2	37	5			2	2		11	10					3	29		2
Hibbing			11	4				2	13		1		1	2							2						8		1
Virginia			16	9			3	5	17		5	1	1					2		3	2					1	9		1
Eveleth			5	4					7	2		1	2								1						5		
Duluth			46	11	1	2		55	47	3	10		32	1			1			6	5					1	4		
Scott			1				1					1																	

TABLE XVIII—DEATHS FROM TYPHOID FEVER IN 1910—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age										
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 t9 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80
Sherburne	3	1	2	3	....	....	....	....	....	....	....	....	....	....	2	1	....	....	....	....	....	1	....	....	1	1	....	....	....
Sibley	1	1	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
Stearns	11	7	4	11	....	....	....	....	1	....	....	1	....	1	1	1	3	3	....	....	....	....	2	5	3	....	1	....	....
St. Cloud	**4**	**3**	**1**	**4**	....	....	....	....	....	....	....	....	....	**1**	....	**1**	**1**	**1**	....	....	....	....	....	**2**	**1**	....	**1**	....	....
Steele	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1	....	....	....	....	....
Owatonna	**1**	**1**	....	**1**	....	....	....	....	....	....	....	....	....	....	....	....	**1**	....	....	....	....	....	....	**1**	....	....	....	....	....
Stevens	3	1	2	3	....	....	....	1	....	....	1	....	....	....	....	....	....	1	....	....	....	1	1	....	1	....	....	....	....
Swift	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....
Todd	5	1	4	5	....	....	....	....	....	....	....	....	....	....	2	....	3	....	....	....	....	....	1	....	....	2	2	....	....
Traverse	4	2	2	4	....	....	1	....	....	....	....	1	....	....	....	....	2	....	....	....	....	....	1	2	....	....	....	1	....
Wabasha	2	2	....	2	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	2	....	....	....	....	....
Wadena	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....
Waseca	2	1	1	2	....	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....	2	....	....	....	....	....	....
Washington	7	4	3	7	....	....	....	....	2	1	....	....	1	1	....	1	1	....	....	....	....	1	2	....	1	2	1	....	....
Stillwater	**6**	**4**	**2**	**6**	....	....	....	....	**1**	**1**	....	....	**1**	**1**	....	**1**	**1**	....	....	....	....	**1**	**2**	....	....	**2**	**1**	....	....
Watonwan	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1	....	....	....	....
Wilkin	9	5	4	9	....	....	....	2	1	....	....	....	....	....	2	2	....	2	....	....	2	....	3	1	3	....	....	....	....
Winona	4	4	....	4	....	....	....	1	2	....	....	....	....	....	....	....	....	1	....	....	....	1	1	....	1	....	1	....	....
Winona	**4**	**4**	....	**4**	....	....	....	**1**	**2**	....	....	....	....	....	....	....	....	**1**	....	....	....	**1**	**1**	....	**1**	....	**1**	....	....
Wright	2	....	2	2	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....
Yellow Medicine	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....
Total	683	480	203	680	3	....	29	6	75	45	15	19	23	53	104	107	98	55	3	3	20	28	117	258	132	74	38	9	1

TABLE XVIII—DEATHS FROM TYPHOID FEVER IN 1910—Continued

COUNTY	Age		Conjugal Cond				Birth Place				Occupation																	
	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Teamster	Teacher	Merchant	Office	Woodworker	Woodsman	Ry.	Professional	Mechanic	Mason	Painter	Bar & Hotel	Miner	Agent	Miscellaneous
Sherburne	...	...	1	2	...	...	1	...	2	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sibley	...	...	1	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Stearns	...	...	4	7	...	...	5	5	1	...	3	...	3	1	...	...	1	...	...	...	...	...	...	1	...	1	...	...	1
St. Cloud	...	...	**1**	**3**	...	...	**2**	**1**	**1**	...	...	...	**2**	**1**	...	...	...	...	...	...	...	...	...	...	...	...	...	...	**1**
Steele	...	...	...	1	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Owatonna	...	...	...	**1**	...	...	**1**	...	...	...	...	...	**1**	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Stevens	...	...	2	1	...	...	2	1	...	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Swift	...	...	...	1	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Todd	...	...	2	3	...	...	1	3	1	...	1	1	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Traverse	...	...	2	2	...	...	2	1	1	...	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wabasha	...	...	2	...	...	...	1	...	...	1	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wadena	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Waseca	...	...	1	1	...	...	2	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Washington	...	...	3	3	1	...	3	1	3	...	4	...	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Stillwater	...	...	**3**	**2**	**1**	...	**3**	**1**	**2**	...	**3**	...	**2**	...	**1**	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Watonwan	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Wilkin	...	...	7	2	...	...	4	3	2	...	4	2	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...
Winona	...	...	3	1	...	...	2	2	...	...	2	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	...
Winona	...	...	**3**	**1**	...	...	**2**	**2**	...	...	**2**	...	...	...	...	...	...	...	...	...	**1**	...	...	...	...	...	...	**1**	...
Wright	...	...	2	...	...	...	2	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Yellow Medicine	...	...	1	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	428	233	10	12	233	126	292	32	257	54	120	22	4	7	34	24	16	18	18	4	8	7		10	31	7	42

TABLE XIX—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	2	1	1	2				1				1						
Anoka	1	1		1								1						
Becker	2	1	1	2								1					1	
Beltrami	10	6	4	10					1	4	2	1	2					
Bemidji	**5**	**4**	**1**	**5**						**3**		**1**	**1**					
Benton	2	1	1	2				1										1
Blue Earth	4	2	2	4			1		1						2			
Mankato	**1**		**1**	**1**			**1**											
Brown	3	1	2	3							1	2						
Carlton	5	3	2	5			1	1	1					1		1		
Cloquet	**1**		**1**	**1**			**1**											
Carver	6	3	3	6									2				1	3
Cass	1	1		1			1											
Chippewa	1	1		1								1						
Chisago	3	1	2	3							1		1				1	
Clay	2	1	1	2							1						1	
Clearwater	5	4	1	5								1	3	1				
Cottonwood	3	2	1	3									1			1		1
Crow Wing	9	5	4	9							1	1	3			1	1	2
Brainerd	**5**	**4**	**1**	**5**							**1**		**1**			**1**		**2**
Dakota	10	2	8	10					1		2	2		2	2	1		
Dodge	3		3	3			1			1		1						
Faribault	8	4	4	8							2	2	1		1		2	
Fillmore	1	1		1								1						
Freeborn	4	1	3	4					1		1	1	1					
Albert Lea	**2**		**2**	**2**								**1**	**1**					
Goodhue	4	2	2	4												2	1	1
Hennepin	138	80	58	137	1		14	13	5	9	11	17	7	11	7	10	16	18
Minneapolis	**131**	**75**	**56**	**130**	**1**		**14**	**12**	**4**	**9**	**10**	**16**	**7**	**10**	**7**	**10**	**14**	**18**
Houston	1		1	1													1	
Hubbard	5	3	2	5				1		1				2			1	
Itasca	1		1	1										1				
Jackson	2	1	1	2								1				1		
Kandiyohi	3	2	1	3				1	1								1	
Lac qui Parle	5	2	3	5				1	2	1				1				
Lake	7	5	2	7				3	1	1					1		1	
Le Sueur	4	2	2	4			1				2						1	
Lincoln	1		1	1				1										
Lyon	1	1		1								1						
McLeod	2	1	1	2			1	1										
Marshall	3	2	1	3			1	1					1					
Martin	3	2	1	3			1						1				1	
Meeker	2	2		2					1						1			
Mille Lacs	4	2	2	4			1	1	1					1				
Morrison	9	5	4	9			1	1				1		2		3		1
Little Falls	**4**	**2**	**2**	**4**			**1**					**1**		**1**		**1**		
Mower	4	1	3	4				1	1	1	1							
Austin	**1**		**1**	**1**						**1**								
Murray	1		1	1			1											
Nicollet	2		2	2			1											1
Nobles	4	2	2	4			1								1	1	1	
Norman	2	1	1	2								1						1
Olmsted	6	2	4	6			1				1	1	1					2
Rochester	**5**	**1**	**4**	**5**							**1**	**1**	**1**					**2**
Otter Tail	5	3	2	5						1		2		1	1			
Fergus Falls	**1**	**1**		**1**								**1**						
Pine	1	1		1					1									
Polk	11	8	3	11			1	1	2			2	3		1		1	
Crookston	**1**	**1**		**1**													**1**	
Pope	2	1	1	2							1				1			
Ramsey	146	76	70	144	2		10	7	10	19	11	12	13	11	9	16	19	9
St. Paul	**143**	**75**	**68**	**141**	**2**		**10**	**7**	**10**	**19**	**10**	**12**	**13**	**11**	**9**	**14**	**19**	**9**
Red Lake	7	4	3	7					1		2		1	3				
Redwood	1	1		1								1						
Renville	6	3	3	6			1					2	1			1		1
Rice	5	2	3	5			1			1				1	1	1		
Faribault	**3**	**1**	**2**	**3**						**1**				**1**		**1**		
Roseau	4	1	3	4										1			3	
St. Louis	37	20	17	37			3	4	5		1	2		4	5	2	7	4
Hibbing	**3**	**1**	**2**	**3**					**1**		**1**			**1**				
Virginia	**4**	**3**	**1**	**4**										**2**		**1**	**1**	

DIPHTHERIA IN 1910—Continued

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
1			1										2				2			
			1										1				1			
	1			1									2				2			
1		2	3	1	3								10				7	3		
		1		**1**	**3**								**5**				**2**	**3**		
1		1											2				2			
		2	2										4				4			
			1										**1**				**1**			
			3										3				3			
	1	1		2			1						4	1			3		2	
		1											**1**				**1**			
	2	2	2										6				6			
		1											1						1	
			1										1				1			
	1	1			1								3				3			
			1				1						1	1				1	1	
		2	1	2									5				5			
			2		1								2	1			2	1		
		4	3	2									9				9			
		2	**2**	**1**									**5**				**5**			
	2	1	5	1	1								10				7	2	1	
			1	2									3				3			
	1		5	2									8				7	1		
					1								1				1			
		2	2										4				4			
			2										**2**				**2**			
	1	1	1	1									4				4			
7	12	43	42	19	10	5							132	5	1		115	16	6	1
7	**12**	**42**	**38**	**18**	**8**	**5**							**126**	**4**	**1**		**108**	**16**	**6**	**1**
				1									1				1			
1		1	1	2									5				4	1		
		1											1				1			
				1	1								1	1			1	1		
		2	1										3				3			
		4	1										5				5			
2		3		2									7				6	1		
		1	1	1	1								4				4			
		1											1				1			
			1										1				1			
			1		1								2				2			
		2	1										3				2		1	
	1	1	1										3				3			
		1	1										2				2			
	1		2	1									4				4			
		3	5	1	1								9				9			
		1	**3**										**4**				**4**			
	1	1			1			1					3	1			2	1	1	
								1						**1**					**1**	
		1											1				1			
1				1									2				2			
		2			1								3	1			4			
	1		1										2				2			
				2	3			1					5	1			4	1	1	
				1	**3**			**1**					**4**	**1**			**3**	**1**	**1**	
		2	2	1									5				5			
		1											**1**				**1**			
		1											1				1			
2	2	2	2	2	1								11				10	1		
			1										**1**				**1**			
		1	1										2				2			
10	11	37	19	28	5	1	4	1					141	3	1	1	50	92	4	
10	**11**	**37**	**46**	**28**	**5**	**1**	**4**	**1**					**138**	**3**	**1**	**1**	**47**	**92**	**4**	
1	1	2	1	2									7				6	1		
			1										1				1			
		1	3	1	1								6				3	3		
		1	1	2	1								5				4	1		
				2	**1**								**3**				**2**	**1**		
		1		3									4				4			
1	1	10	12	7	1	4		1					35		1	1	22	5	9	1
		2			**1**								**3**				**2**			**1**
		1	**3**										**4**				**3**		**1**	

TABLE XIX—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Duluth	**18**	**11**	**7**	**18**	....	....	**1**	**2**	**2**	....	....	....	....	**1**	**2**	....	**6**	**4**
Scott	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Sherburne	2	....	2	2	....	....	....	....	....	1	....	....	....	....	....	....	1	....
Sibley	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....
Srearns	6	1	5	6	....	....	1	1	1	1	2	....	....	....	....	....	....	....
St. Cloud	**1**	**1**	....	**1**	....	....	....	....	**1**	....	....	....	....	....	....	....	....	....
Steele	2	2	....	2	....	....	2	....	....	....	....	....	....	....	....	....	....	....
Owatonna	**1**	**1**	....	**1**	....	....	**1**	....	....	....	....	....	....	....	....	....	....	....
Stevens	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....
Swift	2	1	1	2	....	....	....	....	....	....	1	....	....	1	....	....	....	....
Todd	1	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Traverse	1	....	1	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Wabasha	5	3	2	5	....	....	....	....	....	....	....	2	2	....	1	....	....	....
Wadena	1	1	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Waseca	1	....	1	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Washington	2	1	1	2	....	....	1	....	....	....	....	1	....	....	....	....	....	....
Wilkin	1	....	1	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Winona	7	4	3	7	....	....	....	....	....	....	1	1	....	....	1	2	1	1
Winona	**4**	**3**	**1**	**4**	....	....	....	....	....	....	....	....	....	....	**1**	**1**	1	**1**
Wright	4	3	1	4	....	....	1	1	1	....	....	....	....	....	....	1	....	....
Yellow Medicine	1	....	1	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....
Total	563	299	264	560	3	....	50	42	39	41	45	64	44	46	36	44	65	47

DIPHTHERIA IN 1910

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
....	1	2	5	5	....	4	....	1	....	....	....	....	16	....	1	1	9	2	7	....
....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
....	....	....	1	1	....	....	....	....	....	....	....	....	2	....	....	....	2	....	....	....
....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
1	....	....	3	2	....	....	....	....	....	....	....	....	6	....	....	....	6	....	....	....
1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
....	....	....	2	....	....	....	....	....	....	....	....	....	2	....	....	....	2	....	....	....
....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
....	....	....	....	2	....	....	....	....	....	....	....	....	2	....	....	....	2	....	....	....
1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
....	1	....	2	2	....	....	....	....	....	....	....	....	5	....	....	....	4	1	....	....
....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
1	....	....	1	....	....	....	....	....	....	....	....	....	2	....	....	....	2	....	....	....
....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	....	....
....	1	3	1	1	....	....	....	....	....	1	....	....	6	....	1	....	5	1	1	....
....	1	1	1	....	....	....	....	....	....	1	....	....	3	....	1	....	3	....	1	....
....	....	1	....	1	....	2	....	....	....	....	....	....	2	2	....	....	4	....	....	....
....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	....	....
31	42	151	178	103	35	12	6	4	....	1	....	..	540	17	4	2	397	136	28	2

TABLE XX—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	3	2	1	3					2		1							
Anoka	2		2	2									2					
Becker	3	1	2	3						1	1							1
Brown	6	4	2	6						3		1					2	
New Ulm	**4**	**3**	**1**	**4**						**3**		**1**						
Cass	2	1	1	2				1				1						
Chippewa	4	2	2	4					1	3								
Clay	5	4	1	5			2			1	1	1						
Crow Wing	1	1		1					1									
Dakota	4	2	2	4			2	1							1			
Dodge	1	1		1			1											
Fillmore	2	1	1	2					1				1					
Freeborn	1		1	1					1									
Goodhue	3	2	1	3								3						
Grant	2	2		2							2							
Hennepin	58	26	32	58			3	2	6	1	9	6	7	8	4	6	3	3
Minneapolis	**50**	**23**	**27**	**50**			**3**	**2**	**6**	**1**	**9**	**6**	**6**	**4**	**3**	**5**	**2**	**3**
Hubbard	1	1		1				1										
Isanti	4	2	2	4					1			2	1					
Itasca	1		1	1			1											
Jackson	3		3	3							1		1	1				
Kanabec	1		1	1				1										
Kittson	1		1	1														1
Koochiching	3	1	2	3														3
Lyon	3	1	2	3				1	2									
McLeod	1	1		1					1									
Marshall	1	1		1				1										
Morrison	5	3	2	5					1	2	1			1				
Murray	1	1		1														1
Nobles	2	1	1	2						1			1					
Olmsted	1		1	1													1	
Rochester	**1**		**1**	**1**													**1**	
Otter Tail	7	5	2	7				2	2					2			1	
Pine	1		1	1														1
Polk	2	1	1	2							2							
Ramsey	62	33	29	62			10	12	10	14	4	3	4		1	1		3
St. Paul	**59**	**31**	**28**	**59**			**7**	**12**	**10**	**14**	**4**	**3**	**4**		**1**	**1**		**3**
Red Lake	1	1		1								1						
Redwood	1		1	1												1		
Renville	1		1	1									1					
Rice	3		3	3				1						2				
Faribault	**3**		**3**	**3**				**1**						**2**				
Roseau	3	2	1	3										2	1			
St. Louis	36	18	18	36			4	3	2	4	6	7		3	3	2	1	1
Hibbing	**3**	**1**	**2**	**3**					**1**	**1**	**1**							**1**
Virginia	**5**	**3**	**2**	**5**								**1**			**2**	**1**	**1**	
Duluth	**21**	**10**	**11**	**21**			**4**	**3**	**1**	**3**	**5**	**3**						
Scott	5	2	3	5							1				2			1
Sherburne	1	1		1								1						2
Sibley	2	1	1	2													1	
Stearns	1		1	1														1
Stevens	2	1	1	2				1								1		
Swift	4	2	2	4							1		1		2			
Todd	1	1		1														1
Traverse	1	1		1												1		
Wabasha	3	2	1	3							1						1	1
Waseca	1	1		1								1						
Washington	6	5	1	6					2			3	1					
Stillwater	**5**	**4**	**1**	**5**					**2**			**3**						
Winona	10	8	2	10			3			1	2			1		2	1	
Winona	**10**	**8**	**2**	**10**			**3**			**1**	**2**			**1**		**2**	**1**	
Wright	2	2		2						1					1			
Yellow Medicine	2		2	2				1				1						
Total	283	148	135	283	....	....	26	28	33	32	33	31	20	20	15	14	11	20

SCARLET FEVER IN 1910

Age													Conjugal Cond				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W & D	Not Given	Minn	Other U. S.	Foreign	Not Given
	1	1		1									3				3			
		2											2				2			
		1	2										3				3			
		2	3	1									6				6			
		1	**2**	**1**									**4**				**4**			
		2											2				1		1	
		1	3										4				1			
	1	2	2										5				5			
				1									1				1			
		1	2			1							3	1			4			
			1										1				1			
		1	1										2				2			
			1										1				1			
		2	1										3				3			
		1	1										2				2			
1	8	20	14	9	4	1	1						54	3	1		47	7	3	1
1	**7**	**18**	**14**	**5**	**4**		**1**						**47**	**2**	**1**		**40**	**6**	**3**	**1**
	1												1				1			
			4										4				4			
			1										1				1			
		1	1	1									3				3			
	1												1				1			
				1									1				1			
1		2											3				3			
			2	1									3				2	1		
		1											1				1			
				1									1				1			
		2	2	1									5				2	2	1	
		1											1					1		
		1	1										2				2			
	1												1				1			
	1												**1**				**1**			
2		3	2										7				6		1	
			1										1				1			
		1	1										2				2			
3	3	22	21	9	2	1	1						60	2			28	32	2	
3	**3**	**22**	**19**	**8**	**2**	**1**	**1**						**57**	**2**			**25**	**32**	**2**	
				1									1				1			
				1									1				1			
	1												1					1		
				2	1								2		1		3			
				2	**1**								**2**		**1**		**3**			
	2	1											3				3			
5	3	11	10	5	1			1					35	1			28	6	2	
			2		**1**								**3**				**2**		**1**	
		2	**1**	**1**				**1**					**4**	**1**			**2**	**2**	**1**	
3	**1**	**6**	**7**	**4**									**21**				**21**			
	1		1	3									5				5			
				1									1						1	
			1	1									2				2			
			1										1				1			
			1	1									2				2			
		1	2	1									4				4			
				1									1				1			
1													1				1			
	1		2										3				2	1		
				1									1				1			
			3	3									6				5	1		
			3	**2**									**5**				**4**	**1**		
		6	4										10				10			
		6	**4**										**10**				**10**			
		1	1										2				2			
	1			1									2				2			
13	25	90	93	48	8	3	2	1					271	7	2		216	55	11	1

TABLE XXI—DEATHS

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Amoka	6	1	2	6					1	3	2							
Beltrami	6	2	4	6						4	2							
Bemidji	**6**	**2**	**4**	**6**						**4**	**2**							
Blue Earth	5	2	3	5							3			2				
Mankato	**3**	**1**	**2**	**3**							**3**							
Brown	3		3	3				1	2									
Carlton	2	2				2								2				
Carver	2	1	1	2						2								
Chippewa	1	1		1								1						
Clay	7		7	7						4	1	2						
Clearwater	1	1		1														1
Cottonwood	9	5	4	9						5	4							
Crow Wing	5	3	2	5							3	2						
Brainerd	**5**	**3**	**2**	**5**							**3**	**2**						
Dakota	1	1		1					1									
Douglas	1	1		1								1						
Faribault	1		1	1							1							
Fillmore	3		3	3				1	1		1							
Goodhue	3	1	2	3						1			2					
Red Wing	**1**	**1**		**1**									**1**					
Grant	1	1		1								1						
Hennepin	50	18	32	50					2	14	11	18	1	1				
Minneapolis	**48**	**16**	**32**	**48**					**2**	**14**	**13**	**18**	**1**					
Hubbard	1		1	1									1					
Isanti	5	1	4	5				1	2		1	1						
Itasca	2		2	2														2
Jackson	8	2	6	8							2					2	2	2
Kandiyohi	2	1	1	2						2								
Koochiching	1	1		1					1									
Lac qui Parle	1		1	1							1							
Lake	3	1	2	3							2	1						
Le Sueur	7	1	3	7				2		2	1	1				1		
Lincoln	2		2	2						2								
Lyon	1	1		1								1						
McLeod	2		2	2							1	1						
Marshall	1	1		1							1							
Mille Lacs	1		1	1						1								
Morrison	6	2	4	6			4		1	1								
Little Falls	**1**		**1**	**1**			**1**											
Ottertail	3	1	2	3						1	2							
Pennington	1	1		1							1							
Pine	1		1	1						1								
Polk	9	5	1	9			1	3	2	2			1					
Crookston	**2**	**2**		**2**				**1**	**1**									
Pope	1		1	1						1								
Ramsey	37	18	19	37			3	7	10	7	5	3		1				1
St. Paul	**36**	**18**	**18**	**36**			**3**	**7**	**10**	**7**	**5**	**2**		**1**				**1**
Red Lake	5	1	4	5					1	3	1							
Redwood	6	3	3	6							1	1	4					
Renville	4		4	4							1			1			1	1
Rice	1	1		1							1							
Faribault	**1**	**1**		**1**							**1**							
Roseau	1		1	1							1							
St. Louis	10	5	5	10			1	3		3		1						2
Hibbing	**2**	**1**	**1**	**2**				**1**				**1**						
Virginia	**2**		**2**	**2**			**1**											**1**
Duluth	**4**	**3**	**1**	**4**				**1**		**2**								**1**
Scott	1		1	1								1						
Sibley	3	1	2	3					1	1		1						
Stearns	5	2	3	5					2				1	1				1
Swift	1		1	1									1					
Todd	6	3	3	6					2	2	2							
Wabasha	1		1	1							1							
Washington	1		1	1							1							
Watonwan	3	1	2	3							2	1						
Wilkin	1	1		1							1							
Winona	9	5	4	9			1			1	2	2	2	1				
Winona	**7**	**3**	**4**	**7**							**2**	**2**	**2**	**1**				
Yellow Medicine	3		3	2		1		1	2									
Total	263	105	158	260	....	3	10	19	31	63	62	40	13	9	....	3	3	10

FROM MEASLES IN 1910

Age													Conjugal Cond.				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid.	Not Given	Minn.	Other U. S.	Foreign	Not Given
1	1	2	1	1									6				6			
1	1	3	1										6				6			
1	**3**	**1**	**1**										**6**				**6**			
1		2	1										5				5			
1		1		1									3				3			
1	1					1							2	1			2	1		
	1	1											2				2			
	2												2				2			
				1									1					1		
2	3	2											1				1			
1																				
2			1	1	1	1							7	1	1		9			
1			2	2									5				3		2	
1			**2**	**2**									**5**				**3**		**2**	
1													1				1			
				1									1					1		
						1								1			1			
1		2											3				3			
	1	2											3				3			
	1												1				1			
1													1				1			
13	17	15	3	1	1								50				47	2	1	
13	**17**	**14**	**2**	**1**	**1**								**48**				**45**	**2**	**1**	
1													1				1			
1		3		1									5				4	1		
	1	1											2					2		
1	2	1		2	1	1							6	2			1	4		
2													2				2			
	1												1				1			
			1										1				1			
	1	1		1									3				2		1	
1	1	2	2	1									7				7			
				1			1						1	1			1		1	
		1											1				1			
1	1												2				2			
				1									1				1			
			1										1				1			
3		1		1		1							5	1			5	1		
1													1				1			
1		1		1									3				3			
	1												1				1			
1													1				1			
3	1	2		3									9				8	1		
		1	**1**										**2**				**1**	**1**		
				1									1				1			
14	9	8	5	1									37				22	15		
13	**9**	**8**	**5**	**1**									**36**				**21**	**15**		
	1	2	1	1									5				5			
1	1	2			1	1							4	2			5	1		
2			1	1									4				4			
		1											1				1			
		1											**1**				**1**			
1													1				1			
5	2	2			1								10				8		1	1
1		**1**											**2**				**2**			
	2												**2**				**1**		**1**	
3					**1**								**4**				**3**			**1**
							1							1			1			
1		1		1									3				3			
1	2	1		1									5				5			
					1								1				1			
2	3				1								6				6			
		1											1				1			
			1										1				1			
2				1									3				3			
			1										1				1			
2	3	3	1										9				9			
2	**3**	**2**											**7**				**7**			
		2						1					2	1			2		1	
72	57	65	26	27	7	6	2	1					251	11	1		225	30	7	1

TABLE XXII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	1	1		1										1				
Beltrami	4	2	2	4											1	1	1	1
Bemidji	**2**	**2**		**2**												**1**	**1**	
Benton	4	3	1	4					1				1	1	1			
Blue Earth	2		2	2							1						1	
Mankato	**2**		**2**	**2**							**1**						**1**	
Carlton	3		3	3			1						1					1
Clay	4	2	2	4							2		1	1				
Clearwater	1		1	1						1								
Cottonwood	1		1	1													1	
Douglas	1	1		1									1					
Faribault	2	1	1	2					1					1				
Fillmore	1	1		1			1											
Freeborn	6	2	4	6					1					2	1		2	
Albert Lea	**2**	**1**	**1**	**2**										**1**			**1**	
Hennepin	11	8	3	11			1	2	1	1				5	1			
Minneapolis	**9**	**6**	**3**	**9**				**2**	**1**					**5**	**1**			
Houston	1		1	1				1										
Isanti	1		1	1										1				
Jackson	3		3	3				1					1	1				
Kandiyohi	1		1	1			1											
Kittson	1	1		1									1					
Le Sueur	3	2	1	3									1	2				
Lincoln	1		1	1			1											
Lyon	4	1	3	4					1	2				1				
Marshall	1		1	1							1							
Mille Lacs	1		1	1					1									
Morrison	2	1	1	2				1							1			
Mower	4	1	3	4						1	1				1			1
Austin	**2**		**2**	**2**							**1**							**1**
Norman	4	2	2	4				1	3									
Otter Tail	3	2	1	3					1		2							
Fergus Falls	**2**	**1**	**1**	**2**					**1**		**1**							
Pine	5	1	4	5					1		1				2		1	
Pipestone	1		1	1						1								
Polk	9	7	2	9						1	4				1			3
Crookston	**1**	**1**		**1**							**1**							
Pope	5	3	2	5						1			1		2		1	
Ramsey	15	8	7	15			1	1				1	2	2	5		1	2
St. Paul	**13**	**6**	**7**	**13**			**1**	**1**				**1**	**2**	**2**	**5**		**1**	
Red Lake	3	1	2	3						1			1				1	
Redwood	1	1		1					1									
Renville	....	1	1	1									1					
Rice	2	1	1	2					1						1			
Roseau	5	1	4	5				3		2								
St. Louis	32	13	19	32			3	2	2	2	3	2	4	4	3	2		5
Hibbing	**2**		**2**	**2**			**1**											**1**
Virginia	**3**	**2**	**1**	**3**									**2**					**1**
Duluth	**13**	**3**	**10**	**13**					**1**		**1**	**2**	**1**	**3**	**3**			**2**
Sherburne	1		1	1									1					
Stearns	6	4	2	6				2	2				1	1				
St. Cloud	**3**	**3**		**3**				**1**	**1**				**1**					
Steele	3	2	1	3								1		2				
Owatonna	**1**	**1**		**1**										**1**				
Swift	6	1	5	6									1	1	2			2
Traverse	1	1		1									1					
Wabasha	1	1		1			1											
Washington	4	2	2	4					1			1						2
Stillwater	**1**		**1**	**1**														**1**
Total	172	78	94	172	....	....	10	14	18	13	15	5	20	26	22	3	9	17

WHOOPING COUGH IN 1910

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
	1												1				1			
2	1	1											4				3			1
1	1												2				1			1
3			1										4				4			
2													2				2			
2													2				2			
2	1												3				3			
4													4				4			
1													1				1			
1													1				1			
		1											1				1			
	1									1			1	1			1	1		
1													1				1			
1	1	1											6				5	1		
1	1												2				2			
8	2				1								11				10			1
8	1												9				9			
1													1				1			
1													1				1			
2			1										3				3			
1													1				1			
1													1				1			
3													3				3			
	1												1				1			
	3	1											4				3	1		
	1												1				1			
1													1				1			
2													2				2			
3	1												4				3	1		
2													2				2			
	2	1	1										4				3		1	
2			1										3				3			
1			1										2				2			
4	1												5				5			
1													1				1			
7	1	1											9				8	1		
1													1				1			
5													5				5			
5	6	3	1										15				11	1		
4	6	2	1										13				12	1		
1	1	1											3				3			
		1											1				1			
1													1				1			
	1	1											2				2			
3	1	1											5				5			
19	6	4	3										32				28	2	2	
1		1											2				1		1	
1		1	1										3				2	1		
6	6		1										13				12	1		
	1												1				1			
4	2												6				5	1		
2	1												3				3			
3													3				3			
1													1				1			
3	1	1				1							5	1			5	1		
1													1				1			
1													1				1			
3		1											4				4			
1													1				1			
106	36	19	8		1	1				1			170	2			151	10	4	1

TABLE XXIII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Faribault	1	1	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Hennepin	1	1	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Minneapolis	**1**	**1**	....	**1**	....	....	....	**1**	....	....	....	....	....	....	....	....	....	....
Le Sueur	1	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Ramsey	1	1	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....
St. Paul	**1**	**1**	....	**1**	....	....	....	....	....	....	**1**	....	....	....	....	....	....	....
Rice	1	1	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Rock	1	1	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Winona	1	1	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Winona	**1**	**1**	....	**1**	....	....	....	....	....	**1**	....	....	....	....	....	....	....	....
Total	7	6	1	7	....	....	1	2	1	2	1	....	....	....	....	....	....	....

SMALL POX IN 1910

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
1													1				1			
1													1				1			
1													1				1			
					1									1			1			
1													1				1			
1													1				1			
					1								1				1			
										1				1				1		
							1							1			1			
							1							1			1			
3					2					1			4	3			6	1		

TABLE XXIV—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	2	2		2						1							1	
Becker	14	6	8	13		1	1	3					1		3	4	1	1
Beltrami	12	7	5	12									4	4	2	2		
Bemidji	**4**	**2**	**2**	**4**									**2**	**1**		**1**		
Big Stone	1	1		1											1			
Blue Earth	3	2	1	3											2		1	
Mankato	**1**		**1**	**1**													**1**	
Brown	3	1	2	3										1		2		
New Ulm	**1**	**1**		**1**										**1**				
Carver	1	1		1										1				
Cass	3	1	2	3											3			
Clay	2	2		2											1	1		
Clearwater	5	1	4	5									2	2	1			
Cottonwood	4	3	1	4								1		1	2			
Crow Wing	4	1	3	4										2	2			
Brainerd	**1**		**1**	**1**										**1**				
Dakota	6	6		6								2	1	1	1	1		
Douglas	4	4		4			1		2					1				
Faribault	3		3	3						1					1	1		
Fillmore	2	2		2				1						1				
Freeborn	5	3	2	5											5			
Goodhue	1	1		1													1	
Grant	5	2	3	5			1						1		3			
Hennepin	16	8	8	16			1		2			1	1	4	4	1	1	1
Minneapolis	**15**	**8**	**7**	**15**					**2**			**1**	**1**	**4**	**4**	**1**	**1**	**1**
Houston	1	1		1				1										
Hubbard	4	2	2	4										1	1	2		
Isanti	1	1		1										1				
Itasca	2	1	1	2								2						
Jackson	1	1		1												1		
Kandiyohi	1		1	1									1					
Kittson	1		1	1				1										
Lac qui Parle	1	1		1												1		
Le Sueur	1	1		1												1		
Lyon	3	1	2	3					1						2			
McLeod	1	1		1							1							
Marshall	2	1	1	2											2			
Martin	2		2	2										1		1		
Meeker	1		1	1				1										
Morrison	4		4	4										2	1	1		
Mower	3	2	1	3										1	2			
Murray	5	2	3	5								1		2	1	1		
Nicollet	2	1	1	2												1	1	
Nobles	3	1	2	3										1	1		1	
Norman	5	2	3	5					1					1		3		
Otter Tail	12	7	5	12										2	2	4	3	1
Fergus Falls	**1**		**1**	**1**														**1**
Pennington	1	1		1														1
Pine	1		1	1				1										
Polk	14	6	8	14			1	1	1	1	2	1	2	4				1
Crookston	**1**		**1**	**1**						**1**								
Pope	1	1		1														1
Ramsey	3		3	3			1			1				1				
St. Paul	**3**		**3**	**3**			**1**			**1**				**1**				
Red Lake	4	2	2	4										2	2			
Redwood	6	4	2	6									1	5				
St. Louis	4	1	3	4					2					1			1	
Hibbing	**1**		**1**	**1**					**1**									
Virginia	**1**	**1**		**1**													**1**	
Duluth	**1**		**1**	**1**										**1**				
Sherburne	1	1		1			1											
Stearns	2		2	2			1								1			
Todd	2	2		2											1			1
Traverse	3	1	2	3				1							1	1		
Wadena	3	3		3											2		1	
Washington	1	1		1										1				
Winona	2	1	1	2								1		1				
Yellow Medicine	1	1		1										1				
Total	201	105	96	200	....	1	8	10	9	4	3	9	14	46	50	29	12	7

ANTERIOR POLIOMYELITIS IN 1910

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W & D	Not Given	Minn.	Other U. S.	Foreign	Not Given
		2											2				2			
2		3	2	6	1								14				13	1		
4	1	2	2	2		1							12				11	1		
2		**1**	**1**										**4**				**3**	**1**		
				1									1				1			
		1		1	1								3				3			
		1											**1**				**1**			
			2			1							2	1			3			
						1								**1**			**1**			
							1							1			1			
	1	1	1										3				3			
1				1									2				1	1		
1	1	2	1										5				5			
2			2										4				4			
		4											4				4			
		1											**1**				**1**			
	1	2	1	2									6				6			
2			1	1									4				4			
	1	1			1								3				2	1		
		1	1										2				2			
	1	1	1	2									5				4	1		
1													1				1			
	1			4									5				2	1	2	
5	3	2	3	1	2								16				14	1	1	
4	**3**	**2**	**3**	**1**	**2**								**15**				**13**	**1**	**1**	
1													1				1			
1		2			1								4				3	1		
						1								1				1		
	1			1									1	1			2			
				1									1					1		
		1											1				1			
				1									1						1	
				1									1				1			
				1									1				1			
1		1					1						2	1			2		1	
		1											1				1			
			2										2				2			
				2									2				2			
		1											1				1			
	1	2		1									4				4			
		1	1	1									3				1	2		
	1	2	1	1									5				5			
	1				1								2				2			
		2	1										3				3			
1			1	3									5				4	1		
1		2	3	4	2								11	1			11		1	
		1											**1**				**1**			
			1										1					1		
		1											1				1			
1		2	7	4									14				14			
			1										**1**				**1**			
1													1					1		
			1	1		1							3				2	1		
			1	**1**		**1**							**3**				**2**	**1**		
1				2		1							3	1			4			
2	1	1	1	1									6				4	2		
2	1			1									4				3	1		
1													**1**				**1**			
	1												**1**				**1**			
				1									**1**					**1**		
1													1				1			
	1	1											2				2			
1			1										2				2			
	1		2										3				3			
			1	1	1								3				3			
			1										1				1			
	1		1										2				2			
			1										1				1			
32	19	41	41	48	10	5	2						194	7			176	19	6	

TABLE XXV—DEATHS FROM EPIDEMIC

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Big Stone	1	1	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Chisago	1	1	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Freeborn	1	....	1	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Goodhue	1	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Grant	1	1	....	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Hennepin	2	2	....	2	....	....	....	....	....	....	....	....	....	1	....	....	....	1
Minneapolis	**2**	**2**	....	**2**	....	....	....	....	....	....	....	....	....	**1**	....	....	....	**1**
Isanti	1	....	1	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Le Sueur	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Martin	1	1	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Otter Tail	1	1	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Pine	1	1	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Ramsey	2	1	1	2	....	....	....	....	....	....	1	1	....	....	....	....	....	....
St. Paul	**2**	**1**	**1**	**2**	....	....	....	....	....	....	**1**	**1**	....	....	....	....	....	....
Red Lake	1	1	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Rice	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
St. Louis	2	1	1	2	....	....	1	....	....	....	....	....	....	1	....	....	....	....
Hibbing	**1**	....	**1**	**1**	....	....	**1**	....	....	....	....	....	....	....	....	....	....	....
Stearns	2	2	....	2	....	....	....	....	....	1	....	....	1	....	....	....	....	....
Total	20	13	7	20	....	....	2	1	....	2	2	1	2	5	2	....	....	3

CEREBRO-SPINAL MENINGITIS IN 1910

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
1													1				1			
	1												1				1			
				1									1				1			
					1									1			1			
			1										1					1		
					1	1							1	1			1	1		
					1	1							1	1			1	1		
		1											1				1			
			1										1				1			
			1										1				1			
				1									1				1			
						1								1			1			
1						1							1	1				1	1	
1						1							1	1				1	1	
			1										1				1			
				1									1				1			
1		1											2				1	1		
		1											1					1		
	1	1											2				2			
3	2	3	4	3	2	3	....	....	....	....	....	....	16	4	..	....	15	4	1	...

TABLE XXVI—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Becker	3		3	3						1		1				1		
Benton	1		1	1								1						
Blue Earth	1		1	1						1								
Brown	1		1	1			1											
Chippewa	3		3	3						1				1				1
Clay	1		1	1			1											
Douglas	2		2	2								1				1		
Freeborn	1		1	1									1					
Goodhue	3		3	3				1			1			1				
Red Wing	**1**		**1**	**1**							**1**							
Hennepin	23		23	23			1	3		4	3	4	1	2	1	2	1	1
Minneapolis	**20**		**20**	**20**			**1**	**3**		**3**	**2**	**4**		**2**	**1**	**2**	**1**	**1**
Hubbard	1		1	1					1									
Isanti	2		2	2						1							1	
Jackson	1		1	1				1										
Kittson	1		1	1														1
Koochiching	1		1	1				1										
Le Sueur	2		2	2									1					1
Mahnomen	1		1	1					1									
Marshall	2		2	2						1							1	
Morrison	2		2	2				1							1			
Mower	1		1	1							1							
Murray	1		1	1							1							
Olmsted	1		1	1							1							
Rochester	**1**		**1**	**1**							**1**							
Otter Tail	6		6	6				1	1		1	1			1	1		
Fergus Falls	**1**		**1**	**1**												**1**		
Pine	3		3	3				1								2		
Polk	3		3	3				1			1	1						
Crookston	**1**		**1**	**1**							**1**							
Ramsey	13		13	13					1	2	1	3	3	1	1	1		
St. Paul	**13**		**13**	**13**					**1**	**2**	**1**	**3**	**3**	**1**	**1**	**1**		
Renville	1		1	1					1									
Rice	1		1	1											1			
St. Louis	19	19		19			2	4	2		2	1		5		2		1
Duluth	**16**		**16**	**16**			**2**	**4**	**2**		**2**	**1**		**3**		**1**		**1**
Scott	1		1	1														1
Stearns	2		2	2			1	1										
St. Cloud	**1**		**1**	**1**				**1**										
Swift	1		1	1							1							
Todd	1		1	1					1									
Washington	2		2	2				1									1	
Stillwater	**2**		**2**	**2**				**1**									**1**	
Watonwan	1		1	1					1									
Winona	1		1	1				1										
Wright	1		1	1			1											
Yellow Medicine	1		2	2					1	1								
Total	113		113	113			7	17	10	12	13	13	6	10	5	10	4	6

PUERPERAL SEPSIS IN 1910

Age													Conjugal Cond				Birth Place			
Und 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W & D	Not Given	Minn	Other U. S.	Foreign	Not Given
				1	1	1								3			1	1	1	
						1								1			1			
					1									1			1			
						1								1					1	
					2	1								3			1	1	1	
					1									1				1		
					1	1								2			1		1	
					1									1				1		
						2	1							3					3	
						1								1					1	
				1	15	7							3	19	1		8	2	13	
				1	**12**	**7**							**2**	**17**	**1**		**7**	**2**	**11**	
					1									1			1			
						1	1							2					2	
							1							1					1	
						1								1			1			
						1								1					1	
				1	1									2			2			
						1								1			1			
				1		1								2			1		1	
					1	1								2			1		1	
						1								1			1			
					1									1				1		
						1								1			1			
						1								1			1			
					3	3								6			2	2	2	
					1									1					1	
				1	1		1							3			1	1	1	
					1		2							3				1	2	
					1									1				1		
				1	8	2	2						3	10			2	5	6	
				1	**8**	**2**	**2**						**3**	**10**			**2**	**5**	**6**	
					1									1					1	
						1								1						1
				2	6	8	3						3	16			1	7	8	
				2	**4**	**7**	**3**						**3**	**13**			**4**	**6**	**6**	
					1									1			1			
					1		1							2			2			
					1									1			1			
						1								1					1	
						1								1			1			
				1	1								1	1			1	1		
				1	**1**								**1**	**1**			**1**	**1**		
				1										1				1		
					1									1			1			
				1										1			1			
					1		1							2			1		1	
....				11	50	39	13						10	102	1		39	25	48	1

TABLE No. XXVII

BIRTHS REPORTED FOR 1911

COUNTY	Total	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Delayed reports not distributed by months but included in totals
Aitkin	298	23	18	31	22	18	22	34	18	27	21	26	22	16
Anoka	238	32	22	16	15	20	18	21	22	17	14	15	17	9
Becker	492	40	27	47	48	39	40	35	47	34	44	41	41	9
Beltrami	486	35	43	42	35	41	27	54	36	29	47	46	37	14
Benton	322	19	35	28	29	33	29	21	29	19	24	23	28	5
Big Stone	217	12	17	13	27	12	29	19	20	20	12	13	15	8
Blue Earth	603	42	39	58	39	59	54	54	44	47	56	55	39	17
Brown	554	45	40	49	48	43	48	47	50	45	52	40	38	9
Carlton	412	36	39	34	40	34	38	44	30	24	32	24	33	4
Carver	409	49	42	35	38	37	22	31	34	28	25	29	32	7
Cass	209	12	17	12	24	20	19	19	17	16	19	8	12	14
Chippewa	327	29	27	24	27	28	27	25	21	37	27	25	14	16
Chisago	244	21	23	26	14	18	29	28	21	13	13	21	15	2
Clay	433	44	35	48	34	31	43	37	33	21	38	37	27	5
Clearwater	178	13	17	19	20	14	10	14	12	17	10	12	15	5
Cook	27	1	3	1	3	4	1	2	4	1	2	1	2	2
Cottonwood	373	22	28	32	26	27	28	35	31	28	36	30	38	12
Crow Wing	449	34	40	43	30	29	37	43	47	35	32	34	42	3
Dakota	512	45	44	42	41	45	48	46	41	35	36	35	37	17
Dodge	215	16	7	19	19	15	15	14	23	24	19	12	13	19
Douglas	384	20	22	34	28	41	33	37	47	33	31	20	23	15
Faribault	350	30	24	29	23	22	20	42	33	32	31	31	15	18
Fillmore	481	37	35	40	28	39	43	47	40	32	44	41	27	28
Freeborn	430	32	43	33	35	28	37	33	44	37	38	31	25	14
Goodhue	590	44	43	40	61	50	56	63	48	64	42	34	43	2
Grant	186	10	17	28	20	11	11	13	18	17	14	13	12	2
Hennepin	6,646	608	461	576	390	591	592	634	619	472	549	540	576	38
Houston	280	29	24	26	28	19	18	27	21	15	18	24	20	11
Hubbard	229	12	12	25	24	19	14	17	20	14	27	19	21	5
Isanti	284	33	25	29	19	16	25	25	18	34	19	18	16	7
Itasca	486	41	42	45	39	24	33	42	35	50	31	35	46	23
Jackson	320	26	26	32	24	26	27	27	23	31	25	26	24	3
Kanabec	144	9	16	10	10	9	16	14	14	12	7	11	14	2
Kandiyohi	454	38	38	39	32	42	30	44	38	35	37	38	32	11
Kittson	246	20	10	24	21	25	28	24	21	24	17	10	20	2
Koochiching	148	14	5	6	14	10	13	8	18	15	10	15	15	5
Lac qui Parle	405	30	33	35	37	31	34	31	43	28	41	36	23	3
Lake	219	19	17	26	16	15	22	19	13	14	17	20	16	5
Le Sueur	333	19	35	21	36	26	32	32	21	20	29	28	31	3

Lincoln	257	18	11	22	22	19	19	29	26	27	26	16	13	9
Lyon	350	32	26	40	26	31	22	29	22	21	30	29	35	7
McLeod	439	26	37	37	33	49	44	31	43	40	31	40	25	3
Mahnomen	63	7	2	7	5	5	6	4	3	4	6	8	5	1
Marshall	406	36	29	42	31	27	37	31	33	36	40	24	35	5
Martin	402	47	26	35	31	26	33	29	35	44	34	25	32	5
Meeker	370	34	30	31	29	30	33	28	29	30	26	36	31	3
Mille Lacs	244	16	33	23	21	28	21	20	11	18	12	11	9	15
Morrison	555	56	43	47	47	46	44	45	38	52	50	42	33	12
Mower	423	27	25	34	35	33	27	40	45	45	41	28	29	14
Murray	303	22	26	25	24	25	30	27	33	23	19	25	23	1
Nicollet	284	21	25	24	22	21	26	32	26	23	23	25	11	1
Nobles	396	29	36	28	29	26	33	37	40	30	33	45	25	5
Norman	277	29	26	19	35	19	21	13	26	26	25	15	20	3
Olmsted	414	21	30	36	25	35	32	44	38	35	32	29	38	19
Otter Tail	1,062	81	83	108	90	88	78	91	82	102	91	75	79	14
Pennington	301	24	20	35	21	35	23	21	24	25	27	13	28	5
Pine	381	37	32	46	26	33	47	35	26	24	31	16	20	8
Pipestone	242	25	22	19	26	17	13	22	18	18	19	14	22	7
Polk	782	85	68	68	73	61	49	62	67	71	58	52	54	14
Pope	264	30	14	30	9	26	20	23	17	22	26	20	18	9
Ramsey	4,684	371	360	389	310	404	442	449	394	401	397	388	362	17
Red Lake	144	7	15	14	11	16	14	10	14	5	14	10	8	3
Redwood	507	46	45	32	55	39	41	46	37	39	41	42	39	5
Renville	530	45	41	40	42	36	53	51	51	37	53	37	39	5
Rice	452	46	33	38	36	30	30	42	36	42	36	44	28	11
Rock	251	28	20	18	19	25	14	17	20	20	23	17	27	3
Roseau	296	18	17	20	21	26	23	25	31	26	28	26	19	16
St. Louis	4,759	399	392	393	389	300	393	467	403	407	361	391	414	50
Scott	303	21	20	30	17	28	25	27	29	36	25	24	20	1
Sherburne	162	11	15	18	10	13	10	12	20	17	8	14	13	1
Sibley	364	25	31	27	34	40	22	29	32	31	27	26	31	6
Stearns	1,292	129	97	116	122	117	105	112	107	101	110	72	82	22
Steele	358	20	30	32	46	31	21	43	28	25	38	24	18	2
Stevens	225	23	17	18	13	21	17	17	20	15	20	18	21	5
Swift	368	25	29	34	32	34	23	36	34	29	30	32	28	2
Todd	498	54	36	51	36	39	42	42	43	42	33	37	37	6
Traverse	221	19	21	22	15	9	23	16	26	19	20	15	18	1
Wabasha	358	38	30	35	25	35	13	31	23	24	30	22	31	10
Wadena	211	11	10	22	14	14	23	19	19	15	23	13	21	1
Waseca	246	16	17	23	20	20	24	26	28	23	16	17	16	0
Washington	372	35	32	28	36	39	37	20	33	31	27	21	23	10
Watonwan	258	16	18	27	19	23	21	20	29	20	34	12	18	1
Wilkin	239	16	22	26	17	24	22	13	30	23	19	11	8	8
Winona	696	59	61	57	56	64	58	48	61	59	67	53	44	3
Wright	600	52	51	48	51	35	65	40	40	56	51	50	43	15
Yellow Medicine	400	29	24	38	25	27	35	29	40	35	39	31	31	14
Totals	46,625	3,909	3,625	4,069	3,632	3,780	3,935	4,152	4,030	3,790	3,833	3,556	3,516	768

TABLE XXVIII

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec
Aitkin	7	2	5			1	1			2		2			1
Anoka	3		3	1	1		1								
Becker	4	2	2									1	2		1
Blue Earth	2	2									1	1			
Brown	5	2	3		1		1	2						1	
Carlton	10	1	9		3	1	2			4					
Carver	3	1	2			1		1	1						
Cass	196	112	84		27	19	15	1	23	20	22	16	19	11	20
Chisago	7	5	2	1			1		1		1	2		1	
Cottonwood	4	3	1		3	1									
Crow Wing	1	1					1								
Dakota	2	2							2						
Dodge	1		1	1											
Douglas	3		3		1						1			1	
Faribault	5	2	3	1		1		1				1	1		
Fillmore	3	3				1	1	1							
Freeborne	2		2										1	1	
Goodhue	8	3	5	2			1	3			1			1	
Grant	2	1	1	1			1								
Hennepin	19	10	9		1	2		5	1	2		2	3	3	
Houston	3	1	2	1		1									1
Isanti	5	1	4	2		3									
Itasca	3	1	2					1		1		1			
Jackson	1	1											1		
Kanabec	3	3						1	1						1
Kandiyohi	5	3	2	1										3	1
Kittson	3	1	2						1					1	1
Lac qui Parle	6	3	3			1									5
Lake	2		2				1		1						
Le Sueur	3	1	2		1		1			1					
Lincoln	2	1	1		2										
Lyon	2	1	1					1							1
Mahnomen	1		1			1									
Marshall	4	2	2	1			1				1				1
Martin	4	3	1			1				1	1		1		
Meeker	3	2	1	1		1			1						
Mille Lacs	1		1					1							
Morrison	5	4	1			1	2	1			1				
Mower	5	4	1	2		1							1	1	
Nicollet	18	8	10		1	2	1	2	2	7	2			1	
Nobles	4	3	1		1				1			1	1		
Norman	4	2	2	1	1	1			1						
Olmsted	9		9	1	1						1		2	4	
Otter Tail	14	4	10	2	1	2	1	1	1	2	1		2		1
Pennington	3	1	2		1	1				1					
Pine	5	3	2		1			1		2			1		
Pipestone	2	2		1											1
Polk	6	4	2	1			1		1	1					2
Pope	4	2	2	1		1	1						1		
Ramsey	2	2				2									
Red Lake	2	1	1	1		1									
Redwood	2	1	1										1		1
Renville	5	3	2	1	1		2							1	
Rice	7	6	1	3		1	1					1		1	
Rock	5	4	1		1	1			1			1			1
Roseau	5	2	3			1	1	1			1				1
St. Louis	196	134	62	10	8	32	15	38	18	18	15	10	16	6	10
Scott	3	2	1			1		1				1			
Sherburne	1	1										1			
Sibley	5	4	1					1	1	1				1	1
Stearns	21	9	12			2	2		1	1	2	11	2		
Steele	5	3	2	1	1		1			1	1				
Stevens	2		2					1							1
Swift	5	3	2	1			1		1	1				1	
Todd	6	2	4		1	2		1					1		1
Wabasha	10	3	7		1	1		1	1		1	1	1	1	2
Wadena	4	1	3					2		1					1
Waseca	1	1													1
Washington	6	4	2				1			3	1				1
Watonwan	2	1	1			1	1								
Winona	6	4	2		2		2				1				1
Wright	8	2	6	2	1					2	1		2		

TUBERCULOSIS

FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
			1	2			4									
		1		1		1										
					1	1	1									
						1			1							
					1		1	1		1						1
			1		2		4	2								1
					1	1						1				
				33	39	55	28	15	13	5	5					3
					2		2	1	2							
					1			1	1			1				
									1							
																2
																1
					1		1		1							
					2	3										
					1				1							1
						2										
				1	1	1	3		1		1					
				1	1											
			1	2	5	4	4		2	1						
										1		1				1
			1	1		1	1	1								
					2	1										
						1										
				1	1				1							
		1	1	1		1										1
			1				1									1
			1	1	1			1			1	1				
					1		1									
					1	1										1
					2											
						1		1								
																1
					1	1	2									
						3			1							
								2		1						
					1											
				1	2			1								1
						2	1		1		1					
		1			1	3	3	1	1	4	3			1		
					1		1	2								
			1	1		1			1							
					1	1		1		2			1	2	1	
				4	4	2	2			1	1					
											3					
				1		1	1	1		1						
				1			1									
					2	2	2									
				2	2											
							1	1								
								1	1							
				1	1											
						1	1		1						2	
				1	1	1			1		2					1
				2			1		2							
					2		1	1			1					
2	2	1	5	11	33	38	24	22	11	8	6	8	1	1		23
					1	1		1								
				1												
					2	2	1									
			1	3	3	4	3	3				2				2
						2	1	1				1				
					1					1						
			1		2	1			1							
				1		1	2				1					1
					2	4	3	1								
				2	1											1
					1											
						2	1			1	1					1
							1	1								
					1	2	2					1				
		1			2			2			1				1	1

TABLE XXVIII—TUBER

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Yellow Med.	5	1	4			1					1			1	2
Total....	731	407	324	41	63	90	61	69	61	72	57	53	59	44	61
CITIES over 5000 population															
Mankato.....	2	2									1	1			
New Ulm....	4	1	3		1			2						1	
Cloquet......	4		4		3		1								
State Sanat'm	195	111	84		27	19	15	1	23	19	22	16	19	14	20
Brainerd.....	1	1					1								
Albert Lea...	1		1											1	
Minneapolis..	13	8	5		1			4	1	2		1	2	2	
Austin.......	1	1												1	
St. Peter.....	16	8	8		1	1	1	2	1	7	2			1	
Rochester....	9		9	1	1						1		2	4	
Fergus Falls..	1	1											1		
Crookston....	1	1							1						
St. Paul......	2	2				2									
Faribault.....	2	1	1	1								1			
Duluth......	170	115	55	5	7	32	11	36	17	15	12	7	15	6	7
Eveleth......	5	3	2	1			2					1			1
Hibbing......	6	6		1			1	1			1	1			1
Virginia......	8	4	4	1	1		1	1		3	1				
St. Cloud....	11	5	6									10	1		
Owatonna....	1		1							1					
Stillwater....	6	4	2			1			3	1				1	
Winona......	4	3	1		1		1				1				1

CULOSIS—Continued

FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
......	......	......	......	......	3	......	1	1	......	......	......	......	......	......	......	......
2	2	5	15	76	137	150	107	66	45	27	27	16	2	4	4	46
......	......	......	......	......	......	1	......	......	1	......	......	......	......	......	......	......
......	......	......	......	......	1	......	......	1	......	1	......	......	......	......	......	1
......	......	......	......	......	1	......	1	1	......	......	......	......	......	......	......	1
......	......	......	......	33	39	55	28	15	13	5	5	......	......	......	......	2
......	......	......	......	......	......	......	......	1	1	......	......	......	......	......	......	......
......	......	......	......	......	......	1	......	......	......	......	......	......	......	......	......	......
......	......	......	......	1	3	4	3	......	1	1	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	1	......	......	......	......	......	......	......
......	......	......	......	......	1	3	2	1	1	4	3	......	......	1	......	......
......	......	......	......	......	1	1	......	1	......	2	......	......	1	2	1	......
......	......	......	......	......	1	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	1	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	1	1	......	......	......	......	......	......	......	......
......	......	......	......	......	......	1	......	......	1	......	......	......	......	......	......	......
2	2	1	4	9	26	32	20	20	10	7	5	8	......	1	......	23
......	......	......	1	......	2	......	2	......	......	......	......	......	......	......	......	......
......	......	......	......	1	1	......	......	2	......	......	1	......	1	......	......	......
......	......	......	......	......	2	4	1	......	1	......	......	......	......	......	......	......
......	......	......	1	2	......	3	1	2	......	......	......	......	......	......	......	2
......	......	......	......	......	......	......	......	1	......	......	......	......	......	......	......	......
......	......	......	......	......	......	2	1	......	......	1	1	......	......	......	......	1
......	......	......	......	......	1	2	1	......	......	......	......	......	......	......	......	......

TABLE XXIX—

CASES REPORTED

COUNTY	Total	Males	Fe-males	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	4	2	2								1	1			2
Anoka	31	18	13	13	16		2								
Becker	14	5	9							2	2	1	2	3	4
Beltrami	68	55	13	1	1		2			8	13	22	20	1	
Blue Earth	28	19	9		1		1	2		5	8	1	1	4	5
Brown	4	3	1									2	1	1	
Carlton	12	5	7									5	3	2	2
Carver	2	1	1				1						1		
Cass	3	1	2							3					
Chippewa	5	1	4								1	3			1
Chisago	3	2	1				1			1			1		
Clay	4	2	2				1			1		2			
Cottonwood	5	2	3	1	2							1	1		
Crow Wing	2	1	1									1			1
Dakota	4	2	2	1						1		1			1
Dodge	3	2	1					1		1	1				
Douglas	3	1	2										2	1	
Faribault	13	11	2					3			1	5	3	1	
Fillmore	2	2										1	1		
Freeborn	8	7	1						1	1	1	1	4		
Goodhue	23	15	8	3	1	3	1	1					6	6	2
Grant	6	5	1	3	1					1			1		
Hennepin	193	134	59	7	8	9	4	6	9	17	30	36	22	29	16
Houston	1	1										1			
Isanti	1	1											1		
Itasca	17	7	10	1	1			2	2	3	1	4		2	1
Jackson	1		1	1											
Kanabec	4	2	2	1				1					1	1	
Kandiyohi	7	6	1	1			1				1		3	1	
Kittson	2		2								1		1		
Koochiching	21	19	2		2				3	6	6			2	2
Lac qui Parle	4	2	2		2					1		1			
Le Sueur	1	1			1										
Lincoln	1		1										1		
Lyon	3	2	1									2		1	
Mahnomen	3		3								3				
Marshall	16	12	4	2		1					1	9	1	2	
Meeker	4	3	1			1					2				1
Mille Lacs	5	5									1	2		1	1
Morrison	7	2	5	2	2									2	1
Mower	10	7	3					2	3					2	3
Murray	10	6	4							1	8		1		
Nicollet	13	5	8	1		1	2	5	2				1		1
Nobles	3	3								1		1	1		
Norman	2	1	1	1								1			
Olmsted	15	4	11							1	2	1	6	4	1
Otter Tail	26	10	16	5		3	2	1			2	4	5	2	2
Pennington	2	2		1										1	
Pine	15	8	7						2	6	3	3		1	
Polk	22	14	8	3	3		1			3	5	2	4	1	
Pope	1		1				1								
Ramsey	3	1	2					2				1			
Red Lake	2	2					2								
Redwood	6	2	4									1	4		1
Renville	2	2								1			1		
Rice	20	11	9		1					2	2	5	7	2	1
Rock	3	1	2			1					1		1		
Roseau	8	6	2	2		2		1				2		1	
St. Louis	151	114	37	4	2		1	6	2	14	25	27	23	30	17
Scott	4	2	2		1						1			2	
Sherburne	11	5	6		5			1					5		
Sibley	7	5	2								3			4	
Stearns	7	4	3	1	1			1				2	1		1
Steele	5	5		1							1		1	1	1
Swift	1	1												1	
Todd	6	3	3	4							1				1
Traverse	2	1	1					1				1			
Wabasha	3	1	2										1	1	1
Waseca	1	1												1	
Washington	9	5	4		1	1	1	1		2	1	2			
Watonwan	6	4	2							2	2	1		1	
Wilkin	4	3	1			1	2				1				
Winona	1		1		1										

TYPHOID FEVER

FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
			2	2												
		5	3	8	6	2		2	2			1				2
	1	2	2	3	1		2	1	1	1						
	1	1	2	10	20	8	8	3	5	1	1					8
	1	2	4	6	4	4			2	2		2				1
				1	2											1
			1	4	3	2	1					1				
				1		1										
			1			2										
					1	2	1		1							
				2	1											
		2	1				1									
		2	1	1				1								
						1	1									
				1	2	1										
		1				2										
		1	1	1												
		1	1	2	2	2	1	2				2				
		1				1										
				2	1	2	2		1							
		2	2	8	4	2	2			1	1					1
		1	3			2										
	1	9	5	21	46	35	31	20	9	5	3	1	1		1	5
					1											
		1														
	1	2	2	1	2	3	2		1							
		1														
			1	1		1			1							
		1	1	2	1					1						1
			1		1											
			1		3	1	1		1							14
		1	1	1	1											
				1												
									1							
		1								1	1					
	1	1							1							
			2	3	5		2	1		1	1					1
					1		1	1	1							
				1	1	1			1		1					
			3		2	1				1						
	1			2	1		2	2		1	1					
				3	1				1							5
		1			1	2	1	2	3		2					1
				1		1				1						
						1						1				
		1	1		4		2	2		3	2					
			3	4	4	1	5	1	2	1	1	1	2			1
						1		1								
		5	2	3	1	1		1	2							
		3	4	5	6	1	1	1			1					
											1					
						1	1	1								
				2												
			1	2	2					1						
				2												
		5	3	3	1		1	2	2	1		1		1		
			2		1											
			3	3		1	1									
	3	8	11	13	48	34	10	9	5	1	1					8
				2				1		1						
	4	3	1				1	1				1				
		1	2		1			2		1						
				1	3				1	1						1
			1		1	2	1									
								1								
		2	2		1				1							
		1		1												
		1		1				1								
						1										
				3	1	2	1		1	1						
	2	1					1					1			1	
		1					1		1							1
													1			

TABLE XXIX—TYPHOID

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Wright	7	5	2	2	......	......	......	......	......	1	......	1	1	......	2
Yellow Med.	12	8	4	1	2	......	......	......	......	......	5	4	......	......	......
Total	938	611	327	63	55	23	26	37	21	85	137	161	141	114	72
CITIES over 5000 population															
Mankato	20	14	6	......	1	......	1	2	......	5	5	1	1	2	2
Cloquet	4	3	1	......	......	......	......	......	......	......	......	......	......	2	2
Brainerd	1	......	1	......	......	......	......	......	......	......	......	......	......	......	1
Albert Lea	8	7	1	......	......	......	......	......	1	1	1	1	4	......	......
Red Wing	12	8	4	2	1	3	1	1	......	......	......	......	1	1	2
Minneapolis	185	130	55	7	7	7	4	6	9	17	30	36	22	26	14
Little Falls	7	2	5	2	2	......	......	......	......	......	......	......	......	2	1
Rochester	14	3	11	......	......	......	......	......	......	1	2	......	6	4	1
Crookston	6	2	4	......	1	......	......	......	......	1	2	......	2	......	......
St. Paul	2	......	2	......	......	......	......	2	......	......	......	......	......	......	......
Faribault	15	9	6	......	1	......	......	......	......	2	2	4	4	2	......
Duluth	105	86	19	4	......	......	......	3	1	8	15	17	19	21	17
Owatonna	4	4	......	1	......	......	......	......	......	......	1	......	1	1	......
St. Cloud	3	2	1	1	1	......	......	......	......	......	......	......	1	......	......
Stillwater	6	4	2	......	1	......	1	1	......	1	1	1	......	......	......

FEVER—Continued

FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
......	1	1	...	2	1	....	1	....	....	1	.....	......	......	......	......	......
....	1	2	2	.	.	1	2	2	1	.	..	1	...	......	......	......
...	18	74	79	139	189	126	88	61	48	28	17	13	4	1	2	51
....	1	2	1	3	1	3	...	..	2	...	..	..	...	....		1
.....	....	.....		1	2	1	1	.....	....	......	......	......	......	.....		
......	..	......	..	..	..	1	..	..	....	......	......	......	......	......	.....	.
....	...	......		2	1	2	2	.....	1	......	......	......	......	.....		
......	..	1	2	6	.	1	......	......	.....	1	.....	....	...	...		1
.....		9	5	19	45	32	30	20	9	5	3	1	1	.....	1	5
......	.....	.....	3	.....	2	1	.....	.....	.....	1	.....	......	......	.....	...	..
.....	......	1	.	....	4	.....	2	2	.....	3	2	......	......	......	......	.
......	.....	1	.	2	2	.....	1	.....	.....	.....	.....	......	......	......	.....	..
...	......	......	..	......	..	1	1	.....	.....	......	...	.....	......	...	...	..
.....	....	4	2	2	1	...	1	2	1	1	......	......	.....	1	...	
.....	2	4	7	9	32	24	7	8	4	.....	1	.....	.....	...	.	7
...	...	....	.	....	1	2	1	.....	.....	.....	......	......	......	....	..	..
...	...	...		1	2	....	...	......	......	.....	......	......	....	....	..	.
.	.....	..	.	2	1	1	1	..	1	.....	...	....	......	....	...	...

TABLE XXX—

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	7	6	1	1			1				4			1	
Anoka	11	6	5		2	1	3			4		1			
Becker	4	2	2			4									
Beltrami	11	6	5		1	2	2		1		3		2		
Benton	7	3	4	4				2					1		
Big Stone	8	2	6						1					2	4
Blue Earth	11	1	10	2	2	3		1	1						2
Brown	3	1	2		1							2			
Carlton	7	2	5							3		2	2		
Carver	17	7	8	2	1	5	3	1	1				1		1
Cass	5	3	2			3	1							1	
Chippewa	8	2	6	1	1	4	2								
Chisago	4	1	3	1		3									
Clay	1	1									1				
Cottonwood	32	14	18	8	1	5	1	4		1		2	5	1	4
Crow Wing	17	9	8	3	2		2		7	3					
Dakota	81	47	34	14	2	8	9	4	12	1	6	5	10	3	7
Dodge	2	1	1												2
Douglas	3	2	1		1									1	1
Faribault	62	34	28		3							5	52	1	1
Fillmore	25	7	18	4		3	4	4	1	1	2	2	2	1	1
Freeborn	4	1	3						3						1
Goodhue	26	14	12				2	6		2	5	5		4	2
Grant	19	11	8				1					2	8	6	2
Hennepin	102	55	47	4	8	2	2	55	2	5	2	1	6	9	6
Houston	2	1	1									1		1	
Hubbard	5	3	2				1							2	2
Isanti	11	6	5	1	2		1	1		2				1	3
Itasca	8	5	3				3	1			1	3			
Jackson	3		3	1		1									1
Kanabec	2		2											2	
Kittson	8	5	3							1	5			1	1
Lac qui Parle	10	4	6		1			3		4			2		
Le Sueur	4	3	1	3				1							
Lyon	6	2	4		5										1
McLeod	15	6	9	1	2	3	1	1	1	1	1	4			
Mahnomen	5	1	4		1				2						2
Marshall	4	1	3					2	1	1					
Martin	25	8	17	1	1	1				1	1	2	8	8	2
Meeker	21	6	15	1	6	7		5	1	1					
Mille Lacs	2		2		1			1							
Morrison	15	6	9	6		1		1	3	1	1	2			
Mower	24	7	17	3	1	1	3	3	2	1		3	4	3	
Murray	1		1				1								
Nicollet	6	3	3	1		3		1					1		
Nobles	13	6	7	1	1	3					1	3	2	2	
Norman	11	3	8	1		7							3		
Olmsted	75	24	51	8	15	5	5	1	2	2	7	2	9	12	7
Otter Tail	25	14	11	7		1		7	2	1	1		1	4	1
Pennington	16	8	8		7			8					1		
Pine	18	9	9			1	1		2	1	4	1		7	1
Pipestone	10	8	2				1		2	4	2	1			
Polk	34	22	12				2	7	2	20			2		1
Pope	5	3	2												5
Ramsey	14	9	5	2	1	3	2	1					1	4	
Red Lake	23	8	15		9	1	1	3	1		1	2	5		
Redwood	49	22	27			4	10	3	2	3	9	11	5		2
Renville	50	24	26		5	25	5	1		2	2	4	5	1	
Rice	32	10	22	1	5	4	3	5	3	5	1		1	3	1
Rock	19	15	4	1				1	7	1		2		6	1
Roseau	3	1	2		2				1						
St. Louis	189	104	85	3	6	8	25	14	25	15	10	19	39	10	15
Scott	12	5	7	1	1		1	3							6
Sherburne	19	12	7	9	2		1					3	4		
Sibley	20	12	8		1	1	2	1	7	2	2	1	1	1	1
Stearns	30	14	16	2	6	3	3	4	4	2	3			3	
Steele	7	7			1	1	1		1	1					1
Stevens	21	11	10							1			2	7	11
Swift	7	3	4		1			1			1	1	2		1
Todd	7	5	2						3	1		1			2
Traverse	4	1	3	1		1	1								1
Wabasha	60	28	32	5	1	1	8	3		3	4	3	13	17	2
Waseca	1	1											1		

DIPHTHERIA

FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Unknown
		1	4			1			1							
	3	1	2	1	1	2	1									
			2		2											
	2		3				2									4
		2	3				1		1							
		4	1		1				2							
		2	3	2	2	1							1			
		1		1			1									
	1	4	1	1												
	2	5	3	4			1									
	1	1	2							1						
	2	2	1	2	1											
	1		1	1	1											
		1														
		11	8	8	3	1	1									
	1	1	2	3	2		1	1	3							
	10	32	16	8	2		4	4	1	1	2					1
				1		1										
			1		1		1									
	2	24	15	12						1						8
	5	5	3	5	2	2		1	1	1						
		3	1													
	1	7	8	4	3	2				1						
	2	3	1	1	1	2			1							8
	5	11	7	15	31	6	10	1	4			1			4	10
		1	1													
		2		1	1									1		
	1	1	2	3	2											2
1	4	2			1											
				1				1								1
	1	1														
	2		1	2		1				2						
	2	4	2				1					1				
		2		2												
			1	1	2	1						1				
		4	4	2	2		2				1					
	2	2			1											
	1		2			1										
	2	5	2	2	6	1	1	1	1		1					
	1	5	7	3	1	2		1								4
				2												
	3	6	3	1	1	1										
	4	1	4	8	2	3		2								
			1													
	1	1	1	2		1										
	1	5	2	1	1	3										
	2	3	1	2		1	1	1								
	5	14	11	10	11	8	4	1	5	1	3	1		1		
	6	5	2	3	5	3	1									
	1	6	3	1	1											4
	2	3	3	3	3	1	1		2							
	2	1	1	2									1			
	6	13	7	2	2		1		2		1					
	2	2	1													
	2	3	4	2	1		1			1						
	2	7	3	5	2	1		1	1							1
	9	14	10	5	3	3	1	2		1						1
	8	12	9	6	3	2	5	2					1			2
	1	4	11	6	4		1	1	2							2
	3	1	2	3	1	1	3									2
		2			1											
1	31	12	22	22	24	23	8	2	3	2	2	1			1	2
	2	4	2	3							1					
	2	6	6	1				1	2	1						
	4	4	3	2	1	3	1	1			1					
	4	7	8	4	3		1	1	1			1				
2	1		3							1						
	3	5	7	1	1			1	1							[illegible]
	1	1			3		1			1						
			2	3		2										
		1		1	1			1								
1	6	8	12	7	11	2	7	1	1		1					3
				1												

TABLE XXX—DIPH

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
Washington	27	15	12	1	1		1	4	2	6	1	1	3		7
Watonwan	6	5	1			4		1				1			
Winona	18	12	6	5	1	1		3	3	4			1		
Wright	42	24	18	1	1	6	6	2		7	1	6	1	7	4
Yellow Med	11	7	4	1		6	2	1		1					
Total	1530	757	773	112	112	146	124	171	108	116	82	104	206	132	117
CITIES over 5000 population															
Bemidji	1		1										1		
Mankato	4		4	1	1	1									1
Brainerd	4	2	2	1	1		1			1					
Albert Lea	1		1						1						
Red Wing	5	2	3				1	2						2	
Minneapolis	72	40	32	2	3	2	1	52					2	8	2
Austin	17	4	13	2		1	3	3	1	1		2	2	2	
Rochester	65	18	47	7	15	4	5		2	2	6	1	7	11	5
St. Paul	2	2												2	
Faribault	22	3	19		4	2	3	2	1	5	1		1	3	
Duluth	115	72	43			5	13	10	23	8		11	29	3	13
St. Cloud	14	6	8	2	1		2	2	3	1	1			2	
Owatonna	3	3					1								2
Stillwater	12	9	3	1	1		1	3	2	3		1			
Winona	8	7	1	5	1			1	1						

THERIA—Continued

FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
......	1	6	7	8	3	2										
......	1	2	1			1		1								
.....	1	7		3	2	1										1
....	5	10	7	8	4	3	1			1	1					2
...	2		3	4	1				1							
8	181	359	275	218	164	92	68	29	36	16	14	6	3	2	2	57
			1													
		1	1	1	1											
		1		1	1				1							
		1														
		3	1	1												
	2	5	2	10	29	5	7		4			1			1	7
	3	1	3	5	2	1		2								
	5	12	9	7	11	7	4	1	3	1	3	1		1		
				1	1											
	1	2	7	5	3			1	1							2
4	8	21	14	16	18	17	6	2	3	1	2				1	2
	1	6	2	3	1							1				
1	1									1						
		2	1	5	3	1										
	2	2		1	1	1										1

TABLE XXXI—

CASES REPOR

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.
Aitkin	7	5	2		2	3	2								
Anoka	28	15	13		10	14	3								1
Becker	45	16	29	9	11	14	1						1	2	7
Beltrami	11	4	7		3	1	4	1					1		1
Benton	3	2	1	1	2										
Blue Earth	44	18	26	12	12	8	5	1	2	2		1		1	
Brown	150	61	89	3	25	29	14	11	18	7	2	9	7	18	7
Carlton	11	6	5	1						6				2	2
Carver	18	8	10	2	2	1	1		1				9		2
Cass	2	1	1		1									1	
Chippewa	4	2	2			1	1		1						1
Chisago	2	2				2									
Clay	1		1	1											
Cottonwood	11	7	4		2	3				4					2
Crow Wing	20	8	12		3	6	6	5							
Dakota	28	15	13	9	7	4	2	1			1	3	1		
Dodge	23	12	11	4	3	3	4		1				1	5	2
Douglas	2	1	1								1				1
Faribault	11	7	4		3	1	4					2	1		
Fillmore	84	41	43	27	17	16	8	5		1	3		1	6	
Freeborn	13	8	5	3	2	3	2		1		1				1
Goodhue	90	47	43	34	8	11	11	2	2	3	1		3	8	7
Grant	2	2		2											
Hennepin	29	11	18	1	2	9	11	2					1	3	
Houston	30	14	16	9	8	5	6	1	1						
Hubbard	24	12	12	12	3	2	3						4		
Isanti	1		1		1										
Itasca	6	4	2	1			3						2		
Jackson	2	1	1		2										
Kanabec	1		1				1								
Kandiyohi	21	5	16			1	8	12							
Kittson	7	4	3	2	3	1	1								
Koochiching	2	1	1	2											
Lac qui Parle	42	14	28				5	3		1		5	6	12	10
Lake	3	2	1			2					1				
Le Sueur	1	1	3	1				1		1					1
Lincoln	36	14	22	5	2	4	24		1						
Lyon	7	4	3				1								3
Mc Leod	12	6	6	1	6		1	3						1	
Mahnomen	2	2			2										
Marshall	7	3	4	1	1	2									
Martin	9	4	5			5	2			1			1		
Meeker	13	5	8	2	1	3	1			2	1		2	1	
Mille Lacs	37	16	21	3	27	2	1	4							
Morrison	41	19	22	16	16	7	1	1							
Mower	68	29	39	4	6	3	8	4	3		3	10	11	7	9
Murray	8	3	5	2	2	2	1					1			
Nicollet	14	5	9	1		1				1		1		6	4
Nobles	17	7	10			13		3		1					
Norman	8	4	4			1	1	1	1			1	1		2
Olmsted	307	113	164	69	71	48	40	9	9	7	3	5	15	21	10
Otter Tail	3	2	1			1	1						1		
Pennington	4	3	1		3		1								
Pine	15	10	5	6	8										1
Pipestone	20	12	8		2	2	14	1			1				
Polk	15	5	10	4		3	2		1				1	3	1
Pope	2		2								1		1		
Ramsey	10	5	5	2	2	3			1	1					1
Red Lake	4	2	2	4											
Redwood	21	10	11			1			1			1	12	4	2
Renville	7	6	1			2	1	2					1	1	
Rice	62	28	34	20	14	9	8	5		1		2	2	1	
Rock	72	32	40	41	18					9		3		1	
Roseau	21	11	10	1	6	1	4	6	1	2					
St. Louis	275	149	126	3	11	43	42	69	18	7	11	16	21	17	17
Scott	20	6	14			1	9	5							5
Sherburne	1		1				1								
Sibley	19	11	8	2	3	2	2	3	1	2		2	1	1	
Stearns	15	6	9	9	1	3		2							
Steele	12	5	7						1				1	6	4
Stevens	7	2	5				1	4						2	

SCARLET FEVER

TED FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
	1	1	1		1											
		8	9	3	2				1							5
	8	14	13	8					1							1
	4	3	1		1	1										1
	1	1		1												
	4	13	9	1	4	3	1		1			1				4
3	28	66	40	7	3	1										2
1	4	3	1	1		1										
	4	7	1	1												2
	1	1														
	2		2													
			1	4												
	1															
		4	3	2												2
	3	4	10	1		2										
	10	11	2		3						1					1
	1	7	4	1	1					1						2
		1		1												
	1	1	4	4			1									
	9	24	15	17	1	1	1	1								15
	2	4	4		2											1
2	11	30	21	15	3	3	2									3
			2													
	2	14	11	2												
	6	10	10	4												
	1	10	5	1	1	2			1							
	1															
		3				1	2									
		2														
																1
	3	7	7	2				1								1
	2	4			1											
	1	1														
2	9	16	6	8												1
		2	1													
		2														2
1	11	8	7	5		2	1									1
	1	1	2	1	1											1
	3	3	1	4	1											
		1														4
	1		3	2	1											
	1	4	2	2												
		4	2		2	2										3
	4	11	12	3	4				1							2
	11	11	13	3												
	11	29	14	10	1											3
	4	5	2													
	4	4	1	1	1											
	3	7	4	2	1											
	2	3	1		1											1
1	42	104	66	31	20	13	6	3	2				1			18
		2	1													
		2			1		1									
	4	4	1	5									1			
1	2	5	8	3								1				
	4	6	4	1												
	1	1														
	1	2		2	4	1										
			2	2												
1	4	12	4	2				1								
	1	4			2											
	3	10	26	14	6	1	2									
1	7	32	21	5	2											1
	11	6	2		2											
3	59	106	51	20	8	10	5	3	1	2						7
	6	4	4	3	2	1										
		1														
	3	8	3	4												1
		5	2	3	3	1										1
	2	8	2													
		3	3	1												

TABLE XXXI—SCARLET

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Swift	12	4	8					1	4	2		2		2	1
Todd	37	19	18	11	10	7	4	3	1			1			
Traverse	8	5	3										4	4	
Wabasha	27	16	11	7	3	5	1	1	1		1	2		1	3
Wadena	19	11	8		1	7	4	5							2
Waseca	2	1	1										1	1	
Washington	8	4	4	1	1	3		1							2
Watonwan	7	3	4			1	3	3							
Wilkin	4	3	1		3		1								
Winona	108	45	63	20	31	30	16	8	2						1
Wright	51	26	25	5	25	6	3	3	1	1	1		2	4	
Yellow Med.	9	7	2			7	2								
Total	2265	1070	1195	376	411	368	312	192	74	62	32	67	116	142	113
CITIES over 5000 population															
Mankato	12	6	6	2	2	1	3	1		2		1			
Brainerd	13	3	10			4	5	4							
Albert Lea	1	1									1				
Red Wing	46	22	24	11	7	7	3	1	1	2	1		3	6	4
Little Falls	28	11	17	13	10	5									
Austin	23	8	15	2	1		1	4	2		3			5	5
Rochester	215	101	114	42	53	33	33	7	6	6		4	4	20	7
Fergus Falls	2	2				1	1								
Crookston	5	2	3			1	2		1					1	
St. Paul	1		1		1										
Faribault	47	20	27	20	13	4	1	4		1		2	1	1	
Duluth	179	92	87			28	33	27	7	5	11	16	19	17	16
Eveleth	6	4	2	1		2		1	2						
Hibbing	22	13	9			1	6	9	4				1		1
Virginia	13	5	8			7		3	3						
St. Cloud	12	4	8	9	1	2									
Winona	41	19	22	8	11	11	4	5	2						

FEVER—Continued

FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
	2	1	2	4												
2	5	12	13	3	1											1
	3	4				1										
	2	6	8	7	1			1								2
	1	13	2		1				1							1
			1													1
	3	3	1				1									
		2	5													
	2	2														
	17	31	22	12	9	3										14
	11	18	10	5	3											4
	1	3	4			1										
18	378	794	519	217	101	51	23	10	9	3	1	2	2	..		107
	1	2	2	2	3	1										
	3	4	6													
		1														
	6	15	10	9	1	2	1									2
	5	12	9	2												
	4	9	5	2												3
1	32	73	45	18	15	11	6	3	2							9
		1	1													
	3	1	1													
					1											
	1	7	20	11	6	1	1									
3	38	68	34	11	7	3	4	2	1	1						7
	1	1		1												
	6	11	2	1		1		1								
	2	5	3	2		1										
		3	2	3	3	1										
	10	8	6	4	3	2										

TABLE XXXII—

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
Aitkin	1	1		1											
Anoka	34	11	23	18	5	5	6								
Becker	1		1	1											
Benton	1		1				1								
Blue Earth	3	3		2										1	
Carlton	1		1		1										
Chisago	4		4			2	2								
Dakota	3	2	1	1			2								
Fillmore	5	1	4		3		1	1							
Freeborn	1		1			1									
Goodhue	9	5	4			4	1	1			1		1		1
Grant	7	4	3		1	1	2	3							
Hennepin	4	2	2				4								
Houston	1	1		1											
Isanti	3	1	2		2		1								
Itasca	12	5	7	7	2		3								
Le Sueur	41	21	20	9	21	7	4								
Lincoln	3	2	1		2									1	
Lyon	1	1			1										
Meeker	1		1		1										
Mille Lacs	2	2			1	1									
Mower	28	18	10	17	10	1									
Nicollet	3	2	1	2			1								
Nobles	2		2		1			1							
Norman	1	1		1											
Olmsted	66	28	38	9	37	10	8	1	1						
Otter Tail	1		1									1			
Pine	1		1							1					
Pipestone	1	1		1											
Polk	8	3	5	2			2	1	1	2					
Ramsey	55	26	29		25	30									
Rice	92	39	53	3	6	11	21	37	9	3		1			1
Rock	44	16	28			23	21								
Roseau	1	1												1	
St. Louis	419	234	185	10	5	32	72	128	147	17		3	1		4
Scott	1	1					1								
Stearns	1		1			1									
Steele	33	17	16		1	2	5	23					2		
Swift	19	6	13	1	2	15	1								
Todd	3	2	1			3									
Wabasha	3	2	1		1		1								1
Washington	2	1	1												2
Wilkin	5	1	4				5								
Winona	55	36	19	1	2	3	26	19	4						
Wright	3	2	1				3								
Total	988	502	486	87	133	152	194	215	162	23	1	5	4	3	9
CITIES over 5000 population															
Mankato	2	2		1										1	
Red Wing	6	2	4			4							1		1
Minneapolis	1	1					1								
Austin	27	18	9	17	10										
Rochester	51	22	32	8	29	7	8	1	1						
Crookston	2	1	1	2											
Faribault	86	36	50	3	4	8	20	37	9	3		1			1
Duluth	330	175	155			23	43	101	139	17		3	1		3
Eveleth	12	6	6	4	4	1		2							1
Hibbing	66	49	17	6	1	7	24	20	8						
Virginia	10	4	6				5	5							
Owatonna	28	12	16		1	2	3	22							
Winona	29	20	9			2	4	19	4						

MEASLES
FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
				1												
	9	11	8	4		1	1									
						1										
									1							
2			1													
																1
			3				1									
	2	1														
		1	2	1	1											
		1														
	1	1	1	1	2	1	1									1
	1	2		2	1		1									
		2	1		1											
			1													
	2	1														
	4	5	1				1									1
1	12	22	5	2		1										1
1		1														1
		1														
1																
	1		1													
	1	5		2							1					19
		1		1	1											
	1															1
		1														
1	15	24	14	3	1	1	2									5
									1							
				1												
	1															
	1	3		1	2	1										
		1		35	17											2
	11	17	22	9	8	3	1	3	1							17
2	6	17	10	5	1											3
	1															
16	136	176	27	16	19	8	6	2	2							11
	1															
		1														
1	9	16	1	1	2	1										2
	2	9	4	4												
		1														2
	2	1														
		2														
		1	2	1			1									
	13	11	8	5	5	2	1									10
	1			2												
25	233	337	111	97	61	20	16	5	5		1					77
2																
	1		1	1	1	1										1
					1											
	1	5		1							1					19
1	11	21	10	2	1	1	2									5
	1	1														
	10	17	21	8	6	3	1	2	1							17
13	100	116	22	13	13	5	4	2	2							10
1	2	4	3		1	1										
2	28	24	2	2	4	2	2									
	6	2		1	1											
1	5	15	1	1	2	1										2
	8	5	2	3	2	1										8

TABLE XXXIII—

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Becker	6	4	2											1	5
Beltrami	3	1	2	3											
Blue Earth	1	1				1									
Brown	2	1	1						2						
Carver	5	3	2					5							
Cass	4	3	1				4								
Chisago	1	1											1		
Clay	64	25	39											55	9
Dakota	2	2			1	1									
Dodge	20	9	11							4		1		4	11
Douglas	1	1					1								
Faribault	3	2	1						1	1					1
Fillmore	79	49	30		1	17	31	25					3		2
Goodhue	1	1								1					
Hennepin	231	141	90	22	33	36	19	24	8	2	7	10	8	32	30
Houston	4	2	2				1	1		1					1
Hubbard	2	2					1								1
Isanti	1		1										1		
Kanabec	1	1						1							
Kandiyohi	1	1		1											
Koochiching	3	2	1	3											
Lac qui Parle	23	16	7	1				9	1						12
Le Sueur	3	2	1	1	1										1
Lyon	8	6	2	1	6		1								
McLeod	1	1						1							
Marshall	2	1	1		1										1
Martin	3	2	1											1	2
Mille Lacs	4	2	2				1	3							
Mower	8	8					8								
Murray	18	9	9	4	3		11								
Nicollet	1		1					1							
Nobles	1	1			1										
Norman	21	15	6	13	3	2	1	1							1
Olmsted	9	6	3	1	6	1	1								
Otter Tail	21	13	8		2	1	7	4	5		1	1			
Pipestone	18	8	10	4	7	2	3	1							1
Pope	1		1	1											
Ramsey	512	267	245	44	27	63	66	57	13	1	3	12	91	57	78
Redwood	2		2				1				1				
Renville	3	2	1				3								
Rice	15	12	3		1		1						2	4	7
Rock	4	3	1		1		1				1				1
St. Louis	200	93	107	6	1	20	5	15	62	4	4	3	25	39	16
Scott	8	8											5		3
Sherburne	5	3	2				2	3							
Sibley	1	1		1											
Steele	1		1			1									
Swift	8	7	1											1	7
Todd	7	5	2	4		3									
Traverse	7	3	4	1	6										
Wabasha	2		2		1									1	
Wadena	3		3						1	2					
Washington	11	9	2		10	1									
Watonwan	26	14	12											17	9
Winona	1	1		1											
Wright	7	5	2											3	4
Yellow Med	39	23	16			8	30		1						
Total	1439	798	641	112	112	157	199	151	94	16	17	27	136	215	203
CITIES over 5600 population															
Red Wing	1	1								1					
Minneapolis	208	126	82	22	33	35	19	21	8	2	7	9	5	32	12
Austin	3	3					3								
Rochester	8	5	3		6	1	1								
St. Paul	496	260	236	44	26	60	65	57	13	1	3	12	91	57	67
Faribault	5	5											2	3	
Duluth	92	41	51					1	4	2	3	3	24	39	16
Eveleth	1	1											1		
Owatonna	1		1			1									

SMALLPOX FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Unknown
1	2				1		1	1								
	1	1						1								
				1												
						2										
	1		2	1					1							
				1	2			1								
									1							
1	6	16	12	9	3	5	2	3	2		1	1	2		1	
																2
	2	2	3	3		1	1	1	3	1						3
									1							
				1	1		1									
1	4	11	7	5	10	1	7	5	4	5	1	1				17
					1											
1	9	20	20	29	37	23	22	12	12	9	5	1	2	2		27
	1			1		2										
						1	1									
				1												
																1
																1
		1									1	1				
	1	4	4	3	5		1	2	1	1				1		
					1			1		1						
					1		1	1								5
		1														
						1							1			
					1				1							1
			1	2				1								
						1	4		1							2
2	2	3	2	4				1	1				1			2
					1											
								1								
	1	4	1	2	1	2	2	4	1							
		2	2	2		1					1					
1		2	5	3	3	2	1	1		2						1
	2	4	3	3	1	2	1		2							
1																
10	37	101	100	59	19	33	24	37	24	10	10	3	3	3	1	8
		1	1													
	1				1											1
				7	1	2	1	1	2							1
			1	3												
1	32	51	49	22	11	4	8	8	3	2			1			8
		1			2	2	1			1						1
		1	1		1				2							
					1											
		1														
				2	1	1	2			1	1					
			2	1		2	1									1
	1	2	2	2												
			1				1									
				2		1										
		1	2	2	1			1	1		1					2
	2	6	2	4	2	2	3		1	3				1		
								1								
1	1	3	1													1
	7	7	7	6	4	4	1			2						1
20	113	247	231	181	116	95	87	84	64	38	21	7	10	7	2	86

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Unknown
					1											
1	8	16	19	27	36	23	22	12	11	9	5	1	2	2		14
						1	2									
		2	2	2		1					1					
10	37	97	95	57	48	33	24	37	23	10	10	3	2	3	1	6
				5												
1	15	17	17	14	8	2	6	6	2	2			1			1
																1
		1														

TABLE XXXIV—ANTERIOR

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beltrami.....	3	1	2	.....	.....	1	.....	.....	2	.....	.....	.....	.....	.....	.....
Brown.......	1	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chisago......	1	.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Hennepin	1	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Houston	2	1	1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morrison.....	1	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nobles.......	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Ramsey......	1	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rice.........	1	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Rock	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
St. Louis.....	53	30	23	.....	.....	.....	1	8	6	20	15	3	.....	.....	.....
Waseca	1	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Total....	67	36	31	.....	4	2	2	8	10	21	15	4	1	.....	.....
CITIES over 5000 population															
St. Paul......	1	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Faribault.....	1	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Duluth	5	2	3	.....	.....	.....	.....	.....	.....	1	1	3	.....	.....	.....
Eveleth......	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Hibbing......	2	.....	2	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....
Virginia......	16	12	4	.....	.....	.....	.....	.....	1	12	3	.....	.....	.....	.....

TABLE XXXV—CEREBRO

CASES REPORTED

COUNTY	Total	Males	Females	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Le Sueur.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Nicollet......	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Pine.........	2	2	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis.....	3	2	1	.....	.....	.....	.....	1	.....	1	.....	.....	.....	1	.....
Wadena......	2	1	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....
Totals ...	9	5	4	.....	2	.....	.....	1	1	1	.....	1	.....	2	1

POLIOMYELITIS
FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
	1				1				1							
	1															
		1														
			1													
		1	1													
		1														
							1									
				1												
	1															
		1														
3	33	5	7	1	2	2										
		1														
3	36	10	9	2	3	2	1		1							
				1												
	1															
	1	1	2		1											
						1										
	1		1													
2	12		1	1												

SPINAL MENINGITIS
FOR 1911

Under One Year	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Over 70	Un-known
		1														
	1															
								1					1			
	2	1														
1	1															
1	4	2						1					1			

TABLE

DEATHS FROM ALL CAUSES

COUNTY	Pulmonary Tuberculosis	Non-Pulmonary Tuberculosis	Broncho Pneumonia	Lobar Pneumonia	Cancer	Diarrhoeal Diseases Under 2 Years	Diarrhoeal Diseases 2-5 Years	Acute Bronchitis	Chronic Bronchitis	Diphtheria	Whooping Cough
Aitkin	14	1	1	2	7	2	....	....	....	1	....
Anoka	17	3	4	5	12	3	....	5	....	2	3
Becker	17	4	6	3	11	9	....	1	....	....	1
Beltrami	21	3	13	8	8	10	2	4	1	3	1
Benton	8	....	9	11	8	8	....	....	....	1	....
Big Stone	5	1	7	5	5	9	....	1	....	1	....
Blue Earth	28	13	19	15	34	5	1	1	1	2	....
Brown	16	10	16	11	12	17	....	3	....	....	1
Carlton	15	4	5	9	8	18	....	....	....	5	1
Carver	8	2	5	11	9	6	....	2	4	1	1
Cass	14	1	2	9	1	5	....	1	....	2	....
Chippewa	9	5	11	8	12	9	....	....	....	....	....
Chisago	15	2	10	12	16	11	....	1	2	1	....
Clay	12	5	7	8	11	7	2	2	....	....	2
Clearwater	12	2	4	3	4	3	....	....	....	....	1
Cook	3	....	....	....	1	2	....	....	....	1	....
Cottonwood	5	1	12	11	8	13	1	....	....	7	....
Crow Wing	22	3	5	11	9	11	....	....	....	1	....
Dakota	27	1	19	9	16	15	1	5	....	2	1
Dodge	13	2	11	1	8	2	....	....	....	....	....
Douglas	16	4	7	10	13	7	....	1	....	....	1
Faribault	10	3	8	15	15	8	6	4	3	2	....
Fillmore	17	4	16	10	16	6	4	6	2	3	1
Freeborn	20	4	5	9	12	10	3	1	3	....	....
Goodhue	32	8	17	22	28	8	2	1	4	7	2
Grant	9	4	6	4	6	1	....	1	1	1	....
Hennepin	416	81	188	209	259	150	9	13	12	83	61
Houston	10	4	5	13	12	5	....	....	3	....	....
Hubbard	7	4	4	4	7	7	....	....	....	....	....
Isanti	17	1	7	10	7	4	....	1	2	3	3
Itasca	14	2	14	4	5	17	....	....	....	4	3
Jackson	13	4	5	9	9	4	....	1	2	4	....
Kanabec	2	1	3	5	2	1	....	....	....	1	1
Kandiyohi	17	3	15	14	10	5	....	1	....	....	4
Kittson	5	1	6	5	10	4	....	2	....	1	1
Koochiching	1	1	2	4	2	6	....	1	....	....	....
Lac qui Parle	11	3	12	10	8	8	....	3	2	1	2
Lake	9	....	1	3	4	9	....	....	....	1	....
Le Sueur	9	1	8	8	15	6	2	3	....	2	3
Lincoln	2	....	2	2	3	3	....	1	1	....	....
Lyon	5	1	11	2	13	8	....	....	2	2	6
McLeod	11	1	11	8	11	3	....	2	2	1	1
Mahnomen	5	....	3	1	2	2	....	....	....	....	....
Marshall	19	4	4	14	8	7	....	....	....	3	....
Martin	6	4	6	5	12	10	2	1	1	4	1
Meeker	24	6	14	14	9	11	....	1	2	1	....
Mille Lacs	9	1	6	5	2	5	....	1	1	....	4
Morrison	18	6	15	8	12	11	....	1	1	1	....
Mower	18	7	11	8	19	4	1	3	2	2	1
Murray	5	....	4	9	5	....	....	2	....	....	1
Nicollet	30	4	8	5	10	2	....	8	....	....	3
Nobles	3	2	11	5	9	3	....	....	....	1	1
Norman	14	....	6	7	7	4	....	1	1	2	....
Olmsted	31	13	11	20	84	6	....	1	....	6	2
Otter Tail	68	14	29	26	32	22	2	5	2	8	2
Pennington	10	1	4	3	6	2	....	....	1	4	....
Pine	15	5	8	8	7	6	....	....	....	5	2
Pipestone	4	1	2	4	8	2	....	2	1	2	1
Polk	40	10	6	13	14	6	1	2	1	4	1
Pope	10	5	11	8	8	2	1	1	1	....	....
Ramsey	237	68	113	120	180	113	5	22	10	72	26
Red Lake	5	....	1	3	3	2	....	....	1	7	....
Redwood	8	1	13	13	12	9	....	....	3	8	1
Renville	15	....	9	9	18	14	....	8	4	3	....
Rice	52	11	14	21	19	8	1	2	3	2	....
Rock	6	....	11	7	6	2	2	....	....	....	....
Roseau	16	2	7	5	6	6	....	1	....	....	....
St. Louis	167	53	106	113	73	193	12	16	3	23	7

No. XXXVI

BY COUNTIES IN 1911

Scarlet Fever	Measles	Typhoid	Poliomyelitis	Influenza	Puerperal Sepsis	Tetanus	Cerebro Spinal Meningitis	Small Pox	Chicken Pox	Actinomycosis	Glanders	Accidents	All Other Causes Including Stillbirths	Total Deaths
	1	1		3	2							11	19	95
3		6	1		1							11	96	172
1	1	7		2	2		2					15	94	176
3	1	6					2					48	97	231
	1	1		1								10	58	116
		3		2	1	1	1					16	85	143
2		5	1	2	2							22	195	348
6	1	2	1		2		3					16	126	243
	3	1			2							17	85	173
4		2			1							12	90	158
1		2		1	1			1				11	41	93
		2			2	1						15	69	143
1		2			1							10	83	167
1		9	3	1		2						21	93	186
	1	1		1								5	32	69
												1	3	11
			1	3	2							11	73	148
		5	1	1	1	1						20	124	215
3				2	2	1	2					31	149	286
1	1	1		1	1							5	100	147
	1		1	2	1		4					6	99	173
2	2	1		1	4							12	100	196
7				4	1							9	182	288
1	3	3		1	1							19	114	209
4	1	4		6	2							25	232	405
1		2		1								9	43	89
18	6	45	6	12	18	7	8	2		1		305	2,248	4,157
2			1	1								2	80	138
1	1			3	2							9	48	97
		1			5							10	63	134
		5	1		2							41	80	192
1	4				5	1						8	78	148
		1	1									5	39	62
3		1	1		2							8	110	194
1	4	1										4	44	89
3	1	7	1									13	36	78
5	1	4		1	1							10	73	155
		7					1					29	39	103
	1			1			1					9	114	183
		1	1	4			1					7	37	65
	3	7	1	1	2							10	104	178
2		1		5	1		1					15	113	189
		1			1							1	7	23
	1	4		1	1							10	83	159
	3	1	1	1	2	2		1				12	72	147
	1	3		2								10	101	199
2		1		1	2		1					6	61	108
2	1	5		2	2							8	121	217
5	3	3		6			1					10	138	242
2	3	4		2		1						4	53	95
		2		1	1							7	132	213
3	12	1	1	2	2		2					10	91	162
1		2		1	1							2	59	108
8	1	1	1	4							1	22	310	527
	2	8		9	2							23	360	614
2		2			3							4	50	92
3		2	3	2	3							18	88	175
1	1						1					2	50	82
	1	7		1								15	172	294
	1			1	1							3	74	127
34		26	8	9	20	2	1	2		1		175	1,419	2,666
	3	3	1	1								1	20	51
3	1			1	1							6	79	159
	2	1	1	3								16	99	202
5	13	3		4	2							12	179	351
2	3	2	1		2							7	51	108
3		2		1								6	50	105
12	3	32	12	5	11	1	4		2			259	962	2,072

TABLE No.

DEATHS FROM ALL CAUSES

COUNTY	Pulmonary Tuberculosis	Non-Pulmonary Tuberculosis	Broncho Pneumonia	Lobar Pneumonia	Cancer	Diarrhoeal Diseases Under 2 Years	Diarrhoeal Diseases 2-5 Years	Acute Bronchitis	Chronic Bronchitis	Diphtheria	Whooping Cough
Scott	6	3	6	4	11	5	.....	.....	.....	1	2
Sherburne	6	.....	3	4	3	.....	.....	1	.....	2	1
Sibley	9	1	11	6	4	6	.....	2	1	3	.....
Stearns	26	9	23	19	25	20	2	.....	.....	5	1
Steele	11	6	5	4	13	11	1	1	4	2	1
Stevens	3	.....	7	7	4	2	1	.....	1	2	1
Swift	13	1	7	4	6	11	.....	1	.....	1	.....
Todd	15	2	10	13	17	14	1	1	1	2	2
Traverse	5	.....	4	.....	4	1	.....	1	2	.....	1
Wabasha	13	6	7	10	12	3	1	2	.....	2	2
Wadena	7	1	5	5	5	4	.....	.....	.....	.....	1
Waseca	9	3	3	2	5	7	1	2	2	1	.....
Washington	26	9	6	20	15	4	2	5	1	4	3
Watonwan	7	4	3	7	5	3	.....	2	.....	1	3
Wilkin	2	2	2	2	1	6	1	.....	.....	1	.....
Winona	26	4	7	27	32	10	.....	2	1	3	6
Wright	15	6	11	24	18	11	.....	3	1	1	2
Yellow Medicine	11	4	4	9	7	6	1	2	2	.....	.....
Totals	1,979	477	1,076	1,153	1,425	1,021	71	171	101	355	180

XXXVI—Continued

BY COUNTIES IN 1911

Scarlet Fever	Measles	Typhoid	Poliomyelitis	Influenza	Puerperal Sepsis	Tetanus	Cerebro-Spinal Meningitis	Small Pox	Chicken Pox	Actinomycosis	Glanders	Accidents	All Other Causes (Including Stillbirths)	Total Deaths
1				2	3							15	94	153
			1	1	1							11	63	97
4	1			1	2	1						11	93	156
2	1	4		1	1	1						26	301	467
3	6			1	1							9	101	180
	3			2								4	35	72
		2		3								9	82	140
1		3	1	1	2							8	117	211
1			1									10	28	58
4		1	1	4								19	120	207
		1			1		1					5	37	73
	2	1		1			1					3	75	118
		4	1	4	2		1					23	179	309
		2		1	1			1				6	53	99
		6		1	4							5	41	71
8		3	1	2	1	2	1					36	251	426
1	4	2		3	1		1					12	158	274
	2	1	2		1							3	80	135
190	112	293	59	151	148	24	41	7	2	2	1	1,737	12,622	23 381

TABLE XXXVII—DEATHS FROM PULMONARY TUBERCULOSIS IN 1911

COUNTY	Total	Sex		Color			Month of Death												Age													
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Aitkin	14	8	6	14			1	1			1	2		5			3	1	1		1		2	6	2	2					
Anoka	17	10	7	17				2	1	1	4	1	2	2	1	1	1	1				1	2	2	3	1	3	4	1		
Becker	17	5	12	15		2		2	2		3	1	3	2	1	1	1	1					3	5	1	5	2	1			
Beltrami	21	11	10	21			1	3	4		5	2	2	2	2								1	11	4	3	1	1			
Bemidji	**12**	**6**	**6**	**12**			**1**	**1**	**3**		**3**	**1**		**1**	**2**								**1**	**5**	**3**	**1**	**1**	**1**			
Benton	8	1	7	8			1	1	1		1		1	1		2				1			2	3		1		1			
St. Cloud	**1**		**1**	**1**			**1**																**1**								
Big Stone	5	1	4	5				1	1	1			1		1									3	1		1				
Blue Earth	28	14	14	28			1	1	1	3	3	2	1	3	4	4	1	4	1				1	7	5	5	2	4	3		
Mankato	**9**	**5**	**4**	**9**			**1**			**1**				**2**	**1**	**1**	**1**	**2**						**3**	**2**	**4**					
Brown	16	5	11	16			1	1	3	1	1	1	1	1	2	1	2	1					3	4	5	1	1	2			
New Ulm	**3**	**2**	**1**	**3**				**1**			**1**		**1**												**2**		**1**				
Carlton	15	8	7	10		5	3	2	3	1	2	2				1	1					1	1	5	4		2	1		1	
Cloquet	**3**	**2**	**1**	**3**					**1**		**1**						**1**							**2**	**1**						
Carver	8	3	5	8			2		1		1	1		1		2								5	1	1			1		
Cass	14	8	6	14				1	2	1	3	1		3	1	2					1		1	3	3	4	2				
Chippewa	9	4	5	9			1	2	3	1		2											1	4	2	2					
Chisago	15	12	3	15			5	2				1	2			1	2	2						3	5	2	4	1			
Clay	12	7	5	12			2	1		1	2	3	2	3	1		4	2					1	5	2	2	2				
Clearwater	12	4	8	12				1	3	1	2	1	2	1				1					1	4	2	1		1			
Cook	3	1	2	3				3											1				1					1			
Cottonwood	5	2	3	5			2			1					1			1				1		1	2		1				
Crow Wing	22	11	11	22			2	2	3	2	3	5		2	1	1	1						3	7	3	5	2	2			
Brainerd	**15**	**8**	**7**	**15**			**1**	**2**	**1**	**2**	**3**	**3**		**1**		**1**	**1**						**3**	**4**	**2**	**4**	**2**				
Dakota	27	18	9	27			1	6	2	4	5	3				3	2	1					1	8	5	6	5	2			
Dodge	13	5	8	13			2	2	2	1	1	1		1	2		1							3	3	2	2	2	1		
Douglas	16	5	11	16			3	1	2	1	3	1	1	2		1		1					4	7	2	1	2				
Faribault	10	5	5	10			1		3	2	1	1			1		1						1	5		1		1	2		
Fillmore	17	8	9	17			2	1	2	1	1		3	2	2	1		2			1		2	3	2	5	2		2		
Freeborn	20	12	8	20			2	3	1	2	1	4	4		2			1	1				3	6	6	2		1	1		
Albert Lea	**6**	**2**	**4**	**6**				**2**	**1**				**2**		**1**								**1**	**1**	**2**	**1**		**1**			
Goodhue	32	17	15	32			5	3	2	4	5	3	1	1	5	1		2					1	10	10	6	1	3	1		
Red Wing	**8**	**5**	**3**	**8**			**1**	**1**	**1**	**1**	**1**		**1**		**2**									**3**	**2**	**3**					
Grant	9	6	3	9			1		1	1	1	1		1	1			2						3	1	4	1				
Hennepin	416	241	175	400	16		40	32	37	35	40	39	26	30	38	27	40	32	4	1	5	4	54	121	110	55	39	15	8		
Minneapolis	**404**	**236**	**168**	**388**	**16**		**40**	**32**	**37**	**34**	**37**	**39**	**24**	**28**	**37**	**26**	**38**	**32**	**4**	**1**	**5**	**4**	**54**	**118**	**107**	**53**	**37**	**15**	**6**		
Houston	10	5	5	10				3					1	2	2	2								2	4	1	1	1	1		
Hubbard	7	5	2	7			1	1				1	1	1	1		1		1					2	3	1					
Isanti	17	6	11	17			2	1	1	1	2	4	1		1	1	1	2			1	1	1	7	1	2		1			

TABLE XXXVII—DEATHS FROM PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	Conjugal Cond.				Birth Place				Occupation																						
	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry. Eng.	Miner	Teamster	Teacher	Woodsman	Professional	Mechanic	Mason	Agent	Bar & Hotel	Official	Painter	Dressmaker	Miller	Printer	Miscellaneous
Aitkin	8	6			4	3	7		8	5								1													
Anoka	11	4	2		9	2	6		10	2		2		1	1																1
Becker	7	8	2		8	3	6		10	2		2			1					1											1
Beltrami	6	12	1	2	6	7	7	1	8		2	2		1	1					4	1	1			1						
Bemidji	**3**	**6**	**1**	**2**	**2**	**5**	**4**	**1**	**5**		**2**			**1**	**1**					**2**					**1**						
Benton	6	2			1	2	2		4	1		3																			
St. Cloud	**1**					**1**						**1**																			
Big Stone	3	2			1	3	1		2		1	1							1												
Blue Earth	11	17			11	5	10	2	13	7		1	1	1	1	1						1					1	1			
Mankato	**2**	**7**			**5**	**2**	**2**		**4**				**1**	**1**	**1**	**1**											**1**				
Brown	9	6	1		12	2	2		8	2	1	2							1			1						1			
New Ulm	**1**	**1**	**1**		**2**		**1**		**1**		**1**											**1**									
Carlton	5	8	2		10		5		10	3	1									1											
Cloquet	**2**	**1**					**3**		**2**											**1**											
Carver	1	6	1		7		1		5	2								1													
Cass	4	9	1		8	3	2	1	5	2	1		1			1		1	1		1				1						
Chippewa	6	3			6		3		5	3		1																			
Chisago	8	5	1	1	7	2	6		1	5	2	2	2			1						1								1	
Clay	3	7	2		3	3	6		5	2				1	1			1							2						
Clearwater	4	8			3	2	7		7	4		1																			
Cook	3				2	1			2											1											
Cottonwood	2	3			3		2		3										1												1
Crow Wing	12	9	1		10	3	8	1	9	3	1		3	2								1			1		1				1
Brainerd	**9**	**5**	**1**		**8**	**2**	**5**		**5**	**1**	**1**		**3**	**2**								**1**			**1**		**1**				
Dakota	17	7	3		14	7	4	2	20	4	1			1											1						
Dodge	5	8			6	4	3		7	3						1												1			1
Douglas	11	5			11	1	4		6	3		4				1					1							1			
Faribault	6	2	2		4	2	4		5	1	2	2																			
Fillmore	5	9	3		10	1	6		6	6	1	2			1													1			
Freeborn	11	8	1		14		6		6	8		3	1	1		1															
Albert Lea	**1**	**5**			**4**		**2**		**3**			**1**	**1**			**1**															
Goodhue	14	11	4		20	3	9		13	9	1	1		1	1			1	1							1					3
Red Wing	**4**	**4**			**5**	**2**	**1**		**3**	**1**					**1**			**1**													**2**
Grant	4	5			2		7		2	5		1				1															
Hennepin	220	163	26	7	145	102	148	21	178	10	48	21	24	13	29	13		8	6	3	6	10	1	6	6	3	4	1	6	7	13
Minneapolis	**215**	**158**	**24**	**7**	**140**	**97**	**146**	**21**	**172**	**10**	**48**	**21**	**23**	**13**	**29**	**13**		**7**	**5**	**3**	**5**	**9**	**1**	**5**	**6**	**3**	**4**	**1**	**6**	**7**	**13**
Houston	3	5	2		5	2	3		4	4				1									1								
Hubbard	3	4			2	2	3		3	2	1									1											
Isanti	12	4	1		11	1	5		7	4	1	2						1										1			1

TABLE XXXVII—DEATHS FROM PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	Total	Sex		Color			Month of Death												Age													
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Itasca	14	9	5	14			4	1	1	1	2		2	1			1	1		1			1	5	1	2	2	2			
Jackson	13	8	5	13			1		3		2	2	1		1	2		1						6	2	2	1	2			
Kanabec	2	1	1	2					1		1												1		1						
Kandiyohi	17	7	10	17			2	1	1	1	1	1	1	1		4	1	3					3	4	4	3	2		1		
Kittson	5	3	2	5				1	1		1				1			1						3	1		1				
Koochiching	1	1		1														1							1						
Lac qui Parle	11	7	4	11			2		1				3	2	2		1					1	2	3	2		1	1	1		
Lake	9	5	4	9		1			2	2	3			1		1							2	3	2		1		1		
Le Sueur	9	6	3	9			1	1	1	1		1			1	2		1						3	2	2	1	1			
Lincoln	2		2	2					1							1								1	1						
Lyon	5	1	4	5			1	1	1		1	1												1	3			1			
McLeod	11	5	6	11			1	1	1			2	2				1	3					1	5	2	1		2			
Mahnomen	5	2	3			5	1	1					1			1	1						3	2							
Marshall	19	9	10	19			1	2	1	2	1	3	4	3	1		1						3	8	3	4	1				
Martin	6	5	1	6			1			2	1		1				1							3	3						
Meeker	24	13	11	21			1	1	4	2	2	1	1	3		4	3	2					4	6	9	3	1	1			
Mille Lacs	9	4	5	9				1		1	1	2				3		1					2	1	2	2		1	1		
Morrison	18	9	9	18			1		3	2	1	2	2	3		1	1	2					2	7	4	2	3				
Little Falls	2	1	1	2										1				1							1	1					
Mower	18	11	7	18				1	1	2	1	2	1			5	4	1		1			3	3	6		4	1			
Austin	3	3		3							1						2						1		1		1				
Murray	5	3	2	5			1					1	1			1	1							1	2		1	1			
Nicollet	30	14	16	29	1		3	3	4		1	3	2	5	2	2	2	3					2	9	5	4	7	2		1	
Nobles	3	1	2	3			1					1					1						1	1		1					
Norman	14	6	8	14			2	2	1	2	1	1	1	2	1	1							4	3	2	4	1				
Olmsted	31	13	18	31			4	1	3	4	4	1	3	3	1	2	2	3					3	9	8	4	4	1	2		
Rochester	27	12	15	27			2		3	4	4	1	3	2	1	2	2	3					2	8	7	3	4	1	2		
Otter Tail	68	44	24	67	1		5	7	8	3	10	3	4	5	4	6	10	3	1				7	16	14	11	6	10	3		
Fergus Falls	41	29	12	40	1		4	4	5	3	7	2		4	4	2	4	2	1				2	11	9	7	3	7	1		
Pennington	10	5	5	10			1	2	1	1	1	2		2								1	1	4	1	1	2				
Pine	15	10	5	13		2	2	2	2	1	1	1	2	2			1	1					2	5	5		3				
Pipestone	4	3	1	4			1		1					1				1						2	1				1		
Polk	40	23	17	40			3	7	2	6	3		2	5	3	2	4	3			1		5	13	7	8	2	3	1		
Crookston	14	9	5	14			1	3	2	1	1		2			2	2							5	2	5	1	1			
Pope	10	5	5	10			1	2			2			2	1	1	1						1	3	3	1	2				
Ramsey	237	143	94	223	12	1	32	21	20	18	19	20	23	14	10	18	17	25	2		1	1	20	81	58	28	25	15	5	1	
St. Paul	229	136	93	216	12	1	31	29	20	18	18	19	23	11	9	18	17	25	2		1	1	20	78	56	28	24	14	4	1	
Red Lake	5	1	4	5				1		1	1			1		1							2		2	1					
Redwood	8	5	3	8				1	1	2	1					2	1						2	2	2	1				1	

TABLE XXXVII—DEATHS FROM PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	Conjugal Cond.				Birth Place				Occupation																						
	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry. Eng.	Miner	Teamster	Teacher	Woodsman	Professional	Mechanic	Mason	Agent	Bar & Hotel	Official	Painter	Dressmaker	Miller	Printer	Miscellaneous
Itasca	6	5	1	2	2	2	7	3	6	3	1						2			2											
Jackson	3	9	1		4	4	5		4	6			1			1												1			
Kanabec	1	1			1		1			1		1																			
Kandiyohi	10	6	1		11		6		9	3	1	2			1												1				
Kittson	3	2			2		3		2	2																					1
Koochiching	1						1			1																					
Lac qui Parle	7	3	1		6	2	3		6	3	1	1																			
Lake	4	5			3		6		4		2					1	1			1											
Le Sueur	3	6			6	1	2		1	1	1	1		1				1							1			1			1
Lincoln	1	1			1	1			1			1																			
Lyon		5			3	1	1		4	1																					
McLeod	6	5			7	3	1		5	3									1												2
Mahnomen	3	2			4			1	5																						
Marshall	12	6	1		6	3	10		8	8		2													1						
Martin	2	4			2	2	2		1						3	1		1													
Meeker	12	12			16	2	6		11	10	1				1															1	
Mille Lacs	6	3			2	2	5		5	2	1												1								
Morrison	8	9	1		7	4	7		6	5		3	2		1							1									
Little Falls		**2**			**1**	**1**			**1**						**1**																
Mower	7	11			10	5	3		9	3	1		1			1		1		1				1							
Austin	**1**	**2**			**1**		**2**			**1**						**1**								**1**							
Murray	3	2			1	1	3		2	2					1																
Nicollet	18	11	1		15	5	10		22	3	1							1					1					1			1
Nobles	2	1				2	1		2	1																					
Norman	6	8			7	2	5		8	4		1										1									
Olmsted	18	12	1		18	6	7		25	2				1							1	1					1				
Rochester	**19**	**9**	**1**		**14**	**6**	**7**		**22**	**1**				**1**							**1**	**1**					**1**				
Otter Tail	38	26	4		20	7	41		50	13		1			1					1											2
Fergus Falls	**25**	**14**	**2**		**9**	**3**	**29**		**39**						**1**																**1**
Pennington	6	4			5	1	4		6	3												1									
Pine	8	7			7	2	5	1	5	4			2		1					3											
Pipestone	1	2	1		1	2	1		1					1																	2
Polk	23	15	2		18	7	15		14	16	2				2										1			3			2
Crookston	**7**	**7**			**4**	**3**	**7**		**3**	**5**	**2**				**2**										**1**			**2**			**1**
Pope	3	7			4		6		4	4		1	1																		
Ramsey	112	105	16	4	68	91	76	2	93	9	21	10	9	8	26	6		5	5	1	3	8	3	7	8		4	1	1	2	7
St. Paul	**107**	**102**	**16**	**4**	**65**	**90**	**72**	**2**	**91**	**9**	**21**	**10**	**8**	**8**	**25**	**6**		**5**	**5**	**1**	**3**	**8**	**3**	**7**	**7**		**4**	**1**	**1**	**2**	**4**
Red Lake	2	3			1	3	1		4	1																					
Redwood	5	1	2		4	1	3		4	2			1																		1

TABLE XXXVII—DEATHS FROM PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age												
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Renville	15	7	8	15					3	2	2	1		4	3						1	1	3	6		2			2		
Rice	52	30	22	52			3	6	7	7	3	1	4	4	3		11	3				3	10	16	4	6	6	5	2		
Faribault	**32**	**16**	**16**	**32**			**1**	**5**	**5**	**6**	**2**	**1**	**2**	**2**	**2**		**4**	**2**				**3**	**8**	**13**	**3**	**2**	**1**	**2**			
Rock	6	3	3	6					3	1		2											2	1	2			1			
Roseau	16	7	9	16				2		3	1	1	5	1			2	1					1	8	2	2		1	1	1	
St. Louis	167	109	58	166	1		19	11	20	22	9	9	20	12	6	8	14	17	3	4	3	2	12	67	44	14	11	6	1		
Duluth	**111**	**77**	**54**	**110**	**1**		**15**	**8**	**11**	**14**	**6**	**5**	**13**	**8**	**6**	**7**	**5**	**13**	**1**	**1**	**1**		**6**	**49**	**26**	**11**	**11**	**3**			
Hibbing	**3**	**2**	**1**	**3**					**2**	**1**													**1**	**1**	**1**						
Virginia	**8**	**5**	**3**	**8**			**1**	**1**		**1**	**1**	**1**		**1**			**2**				**1**			**3**	**3**				**1**		
Eveleth	**3**	**2**	**1**	**3**					**1**	**1**			**1**											**2**		**1**					
Scott	6	3	3	6						3	1		1					1						2	1	1	1		1		
Sherburne	6	1	5	6					2	1	1					1		1					1	1	3	1					
Sibley	9	4	5	9				2	1	1	3		2											3	3	2	1				
Stearns	26	10	16	26				2	5	1	4	1	2	1	1	4	1	4		2			3	10	6	2	3				
St. Cloud	**10**	**4**	**6**	**10**				**1**	**4**		**2**		**1**			**1**		**1**						**5**	**3**	**1**	**1**				
Steele	11	5	6	11			1			1	1	3			1	2		2		1		1	3	3	1	1	1				
Owatonna	**5**	**3**	**2**	**5**			**1**					**2**						**2**					**2**		**1**	**1**	**1**				
Stevens	3	1	2	3				1									1	1					1	1						1	
Swift	13	8	5	13			1			1	2	1		2	1	1	1	3					5	5	3						
Todd	15	7	8	15			1	2	2	1	1	1	1	1	1		1							3	8	1	2		1		
Traverse	5	1	4	5				2		2		1										1	1	2	1						
Wabasha	13	6	7	13			3	1	1	1	2		1		1			3						3	3		5	1	1		
Wadena	7	3	4	7				1	1		3	1				1		1			1		1	3				2			
Waseca	9	6	3	9			1		2		2		2				1	1					1	4	2	2					
Washington	26	17	9	25	1		5	4	1	3	2	3	1			1	1	2					1	9	3	3	4	4	1	1	
Stillwater	**15**	**10**	**5**	**14**	**1**		**3**	**4**	**2**	**1**	**2**	**2**				**1**							**1**	**7**	**1**	**1**	**2**	**1**	**1**	**1**	
Watonwan	7	2	5	7			1	1	1		1			1	2								1	1	2	1	2				
Wilkin	2	2		2										1				1						1	1						
Winona	26	15	11	26			2	3	2	3	1	1	3	2	3	5	1						3	11	2	4	3	2	1		
Winona	**21**	**11**	**10**	**21**			**2**	**2**	**2**	**2**	**1**		**2**	**1**	**3**	**5**	**1**						**3**	**10**	**1**	**4**	**2**	**1**			
Wright	15	6	9	15				1	1	1	1	1	2	3		2	2	1					5	4	2	1	2	1			
Yellow Medicine	11	1	10	11				2		1	2				2	2		2					2	6	2	1					
Total	1979	1084	895	1033	32	14	192	181	202	178	194	159	157	151	123	129	153	157	15	11	16	19	226	638	446	253	188	112	48	7	....

TABLE XXXVII—DEATHS FROM PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	Conjugal Cond.				Birth Place				Occupation																						
	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry. Eng.	Miner	Teamster	Teacher	Woodsman	Professional	Mechanic	Mason	Agent	Bar & Hotel	Official	Painter	Dressmaker	Miller	Printer	Miscellaneous
Renville	8	6	1		12		3		10	4	1																				
Rice	37	11	4		32	11	9		33	10	2	1	1		1					1							1				2
Faribault	**29**	**2**	**1**		**22**	**8**	**2**		**28**		**1**	**1**															**1**				**1**
Rock	5	1			2	1	3		3	2																					1
Roseau	7	8	1		4	1	8		6	5						1			1												
St. Louis	93	62	11	1	29	25	110	3	60	7	34	8	1	3	6	3	17	3	4	6	2			1	6	2	1	1			2
Duluth	**67**	**35**	**9**		**15**	**21**	**73**	**2**	**31**	**4**	**32**	**5**	**1**	**2**	**4**	**2**	**8**	**2**	**3**	**3**	**2**			**1**	**5**	**2**	**1**	**1**			**2**
Hibbing	**1**	**2**					**3**		**1**			**1**					**1**														
Virginia	**2**	**4**	**1**	**1**	**1**	**3**	**5**		**3**			**1**				**1**	**2**			**1**											
Eveleth		**3**			**1**		**2**		**1**								**1**			**1**											
Scott	4	1	1		1	1	1		2			1			1										2						
Sherburne	2	4			1	2			5					1																	
Sibley	2	6	1		7		1	1	5	1				1																1	1
Stearns	16	10			16	4	6		13	4		1			1				3			2			1						1
St. Cloud	**6**	**4**			**6**	**2**	**2**		**4**						**1**				**2**			**1**			**1**						**1**
Steele	8	2	1		7	1	2	1	5	2	1				1															1	1
Owatonna	**3**	**1**	**1**		**3**		**2**		**2**	**1**	**1**				**1**																
Stevens	2		1			2	1		1	1															1						
Swift	7	6			11		2		7	5								1													
Todd	1	9	5		7	5	3		8	1	2							1						1					1		1
Traverse	1	1			4		1		3	1		1																			
Wabasha	6	6	1		3	3	7		7	3			1	1			1														
Wadena	1	3			1	2	4		3	3					1																
Waseca	5	4			9				4	4						1															
Washington	12	12	2		13	5	8		11	3		1	1		4	1		1		3											1
Stillwater	**7**	**6**	**2**		**7**	**2**	**6**		**6**			**1**	**1**		**2**			**1**		**3**											**1**
Watonwan	1	6			2	3	2		5	1															1						
Wilkin	2				1		1			2																					
Winona	15	9	2		13	7	6		9	4	1		2	1	3						2	1		1				2			
Winona	**12**	**7**	**2**		**11**	**5**	**5**		**7**	**1**	**1**		**2**	**1**	**3**						**2**	**1**		**1**				**2**			
Wright	8	7			10		5		6	4		2							1					1					1		
Yellow Medicine	8	3			6	2	3		6	1		2			1													1			
Total	1017	825	120	17	815	407	717	10	909	286	138	93	55	41	94	36	21	29	29	30	17	30	7	18	31	6	14	19	9	13	51

TABLE XXXVIII—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1911

COUNTY	Total	Sex		Color			Month of Death												Age												
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Aitkin	1	1		1													1		1												
Anoka	3	2	1	3			1		2												1				1		1				
Beeker	4	2	2	4				1	1				2						1				2	1							
Beltrami	3	2	1	3						1	1					1						1			2						
Bemidji	1	1		1						1															1						
Big Stone	1	1		1												1				1											
Blue Earth	13	6	7	13				1	1	1		3	1	2	2	1		1	2		1	1	3	1		1	1	1	2		
Mankato	3	2	1	3								1		1				1	2				1								
Brown	10	7	3	10			1		2		1				1	1	1	3	3			1	2	2	1	1					
New Ulm	1	1		1											1				1												
Carlton	4	2	2	4							1				1		1	1	1				1		1	1					
Cloquet	2	1	1	2							1							1					1		1						
Carver	2		2	2										2					1				1								
Cass	1	1		1					1											1											
Chippewa	5	1	4	5			1		2	1			1						1		1		1		1		1				
Chisago	2	2		2					1							1									1	1					
Clay	5	1	4	5			1			1				1			2					1	1			1	2				
Clearwater	2		2	2												1	1									1	1				
Cottonwood	1	1		1												1			1												
Crow Wing	3	2	1	3			1			2										1				1			1				
Brainerd	2	2		2						2										1							1				
Dakota	1		1	1									1													1					
Dodge	2	2		2						1				1						1		1									
Douglas	4	2	2	4			1		1						1	1							2	1					1		
Faribault	3	2	1	3							1		1			1							1		1		1				
Fillmore	4	2	2	4								1	1		1		1				2			1	1						
Freeborn	4	2	2	4					1				1		1		1				1	1	1	1							
Albert Lea	2		2	2											1		1				1			1							
Goodhue	8	5	3	8					1	1			2	2	1	1			2	1	1				2	1	1				
Red Wing	3	2	1	3										1	1	1			1	1	1										
Grant	4	4		4					1		1			2									1	2			1				
Hennepin	81	40	41	81			10	3	11	4	10	10	8	4	4	3	6	8	7	6	11	3	9	20	12	6	2	3	2		
Minneapolis	77	39	38	77			9	3	11	4	9	10	7	4	4	3	5	8	7	5	11	3	8	18	12	6	2	3	2		
Houston	4	1	3	4					1		1		1				1				1		1	1	1						
Hubbard	4	2	2	4				1			1	1	1									1	1	1			1				
Isanti	1		1	1										1											1						
Itasca	2	1	1	2					1		1												1	1							
Jackson	4	2	2	4						2	1		1								1				2	1					
Kanabec	1	1		1										1												1					

TABLE XXXVIII—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	Conjugal Cond.				Birth Place				Occupation																					
	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry. Emp.	Miner	Teamster	Teacher	Woodsman	Professional	Mechanic	Mason	Agent	Bar & Hotel	Printer	Nurse	Official	Dressmaker	Miscellaneous
Aitkin	1				1				1																					
Anoka	2	1			2		1		2									1												
Becker	3	1			3	1			3													1								
Beltrami	1	2			2		1		2	1																				
Bemidji		1			1					1																				
Big Stone	1					1			1																					
Blue Earth	10	3			6	3	4		8	2		1								1									1	
Mankato	3				3				3																					
Brown	8	2			8	1	1		8	2																				
New Ulm	1				1				1																					
Carlton	3	1			1	1	2		3											1										
Cloquet	2					1	1		1											1										
Carver	2				2				2																					
Cass	1				1				1																					
Chippewa	3	1	1		4		1		4	1																				
Chisago	2				1		1			2																				
Clay	3	2			1	1	3		4	1																				
Clearwater	1	1					2		2																					
Cottonwood	1				1				1																					
Crow Wing	1	2			1		2		2													1								
Brainerd	1	1			1		1		1													1								
Dakota			1		1				1																					
Dodge	2				2				2																					
Douglas	3	1			3		1		3	1																				
Faribault	2	1			1	1	1		1	1	1																			
Fillmore	4				4				2		1	1																		
Freeborn	3	1			4				4																					
Albert Lea	1	1			2				2																					
Goodhue	8				6	1	1		5	1		1			1															
Red Wing	3				2	1			3																					
Grant	2	2			3		1			3	1																			
Hennepin	55	19	4	3	11	16	22	2	54	4	3	4	3	2			1		2					3		1	2	1		1
Minneapolis	51	19	4	3	37	16	22	2	51	4	3	4	3	2			1		1					3		1	2	1		1
Houston	3	1			3	1			4																					
Hubbard	2	2			2	1	1		2	1													1							
Isanti		1					1		1																					
Itasca	2					1	1		1		1																			
Jackson	1	3			1	1	2		2	1				1																
Kanabec		1					1														1									

TABLE XXXVIII—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	Total	Sex		Color			Month of Death												Age												
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Kandiyohi	3	1	2	3				1						1			1		1					1					1		
Kittson	1	1		1													1								1						
Koochiching	1	1		1									1											1							
Lac qui Parle	3	1	2	3				1	1			1									1	1					1				
Le Sueur	1	1		1					1														1								
Lyon	1		1	1								1												1							
McLeod	1		1	1						1											1										
Marshall	4	3	1	4				1						1		1	1			1					2	1					
Martin	4	3	1	4					1	1		1		1										3		1					
Meeker	6	4	2	6			1		1	2				1	1				2			1		1				1	1		
Mille Lacs	1		1	1						1													1								
Morrison	6	1	5	6			2	1		1				1			1				1	1	2	1	1						
Little Falls	**4**	**1**	**3**	**4**			**2**	**1**		**1**													**2**	**1**	**1**						
Mower	7	4	3	7			2		2	1					1			1	1		1			1	1				3		
Austin	**3**		**3**	**3**					**1**	**1**								**1**							**1**				**2**		
Nicollet	4	1	3	4				1	1			1						1		1	1				1	1					
Nobles	2	1	1	2									2							1			1								
Olmsted	13	6	7	13				1	1	2	2	3	1		1	2							2	4	4	1	1		1		
Rochester	**9**	**3**	**6**	**9**				**1**		**1**	**2**	**3**	**1**		**1**								**1**	**3**	**4**	**1**					
Otter Tail	14	5	9	14			2	1	2	4			2	1			1	1	1	1			2	1	5	2		2			
Fergus Falls	**7**	**2**	**5**	**7**			**1**	**1**	**2**				**1**	**1**				**1**							**4**	**1**		**2**			
Pennington	1	1		1									1										1								
Pine	5	2	3	5				1		2		1				1			1		1						1	2			
Pipestone	1	1		1						1														1							
Polk	10	8	2	10				2	1	3	1	1		1		1			1	1	1	1	1	2	2			1			
Crookston	**2**	**1**	**1**	**2**					**1**					**1**										**1**	**1**						
Pope	5	3	2	5			2			2		1							1		1	1	1					1			
Ramsey	68	34	34	64	4		5	7	6	7	7	5	5	6	5	6	5	4	3	3	7	4	8	23	6	8	4	2			
St. Paul	**67**	**34**	**33**	**63**	**4**		**5**	**7**	**6**	**7**	**7**	**5**	**5**	**5**	**5**	**6**	**5**	**4**	**3**	**3**	**7**	**4**	**8**	**22**	**6**	**8**	**4**	**2**			
Redwood	1	1		1			1																1								
Rice	11	6	5	11			1	1	1	1	1				1		3	2			2	1	2	2	2	1		1			
Faribault	**7**	**4**	**3**	**7**			**1**	**1**		**1**	**1**				**1**			**2**			**1**	**1**	**2**	**2**	**1**						
Roseau	2	1	1	1		1				1							1				1			1							
St. Louis	53	27	26	53			8	5	5	11	2	4	3	6	1	2	1	5	9	5	6	2	9	8	9	2	2	1			
Duluth	**29**	**14**	**15**	**29**			**4**	**4**	**2**	**6**	**1**	**2**	**1**	**4**		**1**	**1**	**3**	**5**	**3**	**1**		**6**	**4**	**5**	**2**	**2**	**1**			
Hibbing	**5**	**3**	**2**	**5**			**2**			**1**	**1**		**1**						**1**		**1**			**1**	**2**						
Virginia	**2**	**2**		**2**					**1**	**1**														**1**	**1**						
Eveleth	**3**	**1**	**2**	**3**			**1**		**1**	**1**												**1**	**1**		**1**						
Scott	3	2	1	3								1	2								1	1		1							

TABLE XXXVIII—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	Conjugal Cond.				Birth Place				Occupation																					
	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry. Emp	Miner	Teamster	Teacher	Woodsman	Professional	Mechanic	Mason	Agent	Bar & Hotel	Printer	Nurse	Official	Dressmaker	Miscellaneous
Kandiyohi	2		1		2		1		3																					
Kittson	1						1			1																				
Koochiching		1			1										1															
Lac qui Parle	2	1			2		1		2	1																				
Le Sueur	1				1					1																				
Lyon	1				1														1											
McLeod	1				1				1																					
Marshall	2	2			1	1	2		2						1															1
Martin	3	1				3	1			2					1														1	
Meeker	4	2	2		3		3		5																					1
Mille Lacs	1				1				1																					
Morrison	3	3			4	2			6																					
Little Falls	3	1			2	2			4																					
Mower	3	2	2		3	3	1		5		1									1										
Austin		1	2		1	2			3																					
Nicollet	3	1			4				4																					
Nobles	2				2				2																					
Olmsted	5	8			5	6	2		7	2					1				1											2
Rochester	3	6			3	4	2		5	1									1											2
Otter Tail	10	3	1		6	6	2		9	2		1			1							1								
Fergus Falls	5	2			1	4	2		5						1							1								
Pennington	1				1										1															
Pine	2	2	1		2	1	2		3								1				1									
Pipestone	1				1				1																					
Polk	8	2			8		2		5	1				1																
Crookston	2				1		1		1	1																				
Pope	4		1		3	1	1		5																					
Ramsey	16	19	3		23	27	18		37	4	3	1	1	1	8	1		2	1		1	3			1	2			1	1
St. Paul	45	19	3		22	27	18		37	4	3	1	1	1	7	1		2	1		1	3			1	2			1	1
Redwood	1				1					1																				
Rice	8	2		1	8	1	2		8	2																			1	
Faribault	6			1	6	1			7																					
Roseau	2				1	1			1	1																				
St. Louis	43	9		1	30	7	16		37	1	5	1	2		3	1	2							1						
Duluth	22	6		1	17	5	7		19	1	4		1		3									1						
Hibbing	4	1			2	1	2		3								2													
Virginia	1	1					2						1			1														
Eveleth	2	1			1		2		3																					
Scott	3				3				2	1																				

TABLE XXXVIII—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age												
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 t9 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Sibley	1	1	..	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Stearns	9	8	1	9	....	....	2	1	..	3	1	....		1	....			1	1	2	1	....	1	2	....	....	2	....	....	....	....
St. Cloud	**3**	**3**	....	**3**			**1**	**1**	....	....	....	....		**1**	....	....	....	....	....	**2**	....	....	....	....	....	....	**1**	....	....	....	....
Steele	6	3	3	6	....	....	....	1	....	....	3	1	....	....	....	1	....	....	1	....	1	1	1	1	....	....	1	....	....	....	....
Owatonna	**4**	**1**	**3**	**4**	....	....	....	**1**	....	....	**3**	....	....	....	....	....	....	....	**1**	....	....	**1**	**1**	....	....	....	**1**	....	....	....	....
Swift	1	1	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Todd	2	2	....	2	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	1	....	....
Wabasha	6	1	5	6	....	....	....	....	....	1	....	3	2	....	....	....	....	....	....	....	....	1	....	3	....	1	....	....	1	....	....
Wadena	1	.	1	1	....	....	....	....	....	1	....	....		....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Waseca	3	1	2	3	....	....	....	....	2	....	....	....		1	....	....	....	....	....	....	....	1	1	....	....	1	....	....	....	....	....
Washington	9	5	4	9	....	....	1	1	1	....	....	1	1	1	....	....	1	2	....	1	....	....	2	2	....	3	....	1	....	....	....
Stillwater	**5**	**3**	**2**	**5**	....	....	....	....	**1**	....		**1**	**1**	....	....		**1**	**1**	....	....	....	....	**2**	....	....	**2**	....	**1**	....	....	....
Watonwan	4	1	3	4	....	....	....	1	.	..		1	1	....	1	....	....	..	1	....	....	....	2	1	....	....	....	....	....	....	....
Wilkin	2	....	2	2	....	..	....	1		1		....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....
Winona	4	1	3	4	.			..	1	..	....	....	1	..		....	....	2	2	....	....	....	....	....	....	1	1	....	....	....	....
Winona	**3**	....	**3**	**3**	..		.		**1**	....	....	....	**1**	....	....	....	....	**1**	**2**	....	....	....	....	....	....	....	**1**	....	....	....	....
Wright	6	2	4	6	....	....	....		1	2	....	2	....	1	....	....	....	..	2	....	....	....	1	1	1	....	1	....	....	....	....
Yellow Medicine	4	1	3	4	....	....	....	....	....	....	....	1	....	2	1	....	....	....	....	....	....	1	2	....	1	....	....	....	....	....	....
Total	477	243	234	472	4	1	43	35	56	63	37	45	42	41	24	27	31	33	47	27	47	27	71	100	64	40	27	15	12	....	....

TABLE XXXVIII—DEATHS FROM NON-PULMONARY TUBERCULOSIS IN 1911—Continued

COUNTY	Conjugal Cond.				Birth Place				Occupation																					
	Single	Married	W.& D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry. Emp.	Miner	Teamster	Teacher	Woodsman	Professional	Mechanic	Mason	Agent	Bar & Hotel	Printer	Nurse	Official	Dressmaker	Miscellaneous
Sibley		1			1					1																				
Stearns	7	2			6	1	2		6	2																				1
St. Cloud	2	1			2		1		2	1																				
Steele	1	2			1		1	1	4	1																				1
Owatonna	3	1			3		1		3																					1
Swift	1				1					1																				
Todd	1	1			1		1		1	1																				
Wabasha	2	3	1		2	4			5										1											
Wadena		1				1			1																					
Waseca	2	1			3				3																					
Washington	4	1	1		4		5		7				1	1																
Stillwater	2	2	1		2		3		4					1																
Watonwan	4				3	1			3										1											
Wilkin	1	1			1		1		2																					
Winona	3		1		2	1	1		3											1										
Winona	2		1		2		1		3																					
Wright	1	2			5		1		4	1															1					
Yellow Medicine	3	1			3	1			3		1																			
Total	329	125	18	5	259	98	117	3	315	52	16	10	7	6	18	2	1	2	7	1	3	6	1	4	2	3	2	1	4	8

TABLE XXXIX DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	1	1		1														1
Anoka	4	3	1	4			2			1	1							
Becker	6	2	4	6						1			1	1	1		1	1
Beltrami	13	5	8	13			4	3		1		1			1	1	1	1
Bemidji	**8**	**4**	**4**	**8**				**3**		**1**					**1**	**1**	**1**	**1**
Benton	9	4	5	9			3	3	3									
St. Cloud	**1**		**1**	**1**			**1**											
Big Stone	7	5	2	7			3	2	1								1	
Blue Earth	19	8	11	19			4	2	4	3	1		1		2		1	1
Mankato	**9**	**3**	**6**	**9**			**2**		**1**	**1**	**1**		**1**		**2**		**1**	
Brown	16	3	13	16			2	3	3	3					1		2	2
New Ulm	**9**	**2**	**7**	**9**			**1**	**1**	**2**	**2**					**1**		**1**	**1**
Carlton	5	4	1	4		1		2	1		1							
Cloquet	**2**	**1**	**1**	**2**					**1**		**1**							
Carver	5	3	2	5					2		1				1			1
Cass	2	2		2			1			1								
Chippewa	11	4	7	11			4		3	1	1					1	1	
Chisago	10	4	6	10			3	2		2		1					1	1
Clay	7	5	2	7			2	2	1	1						1		
Clearwater	4		4	4			3											1
Cottonwood	12	6	6	12			2		4	4					1			1
Crow Wing	5	3	2	5			1	1		1	1		1					
Brainerd	**3**	**2**	**1**	**3**				**1**			**1**		**1**					
Dakota	19	10	9	19			4	3	2	1	2	2			1	2	1	1
Dodge	11	8	3	11			3	4			1		1			1	1	
Douglas	7	3	4	7				1	2	1		3						
Faribault	8	6	2	8			2	2			1	1			2			
Fillmore	16	8	8	16			3	4	2	2	1		1		1		1	1
Freeborn	5	2	3	5			4				1							
Albert Lea	**2**		**2**	**2**			**1**				**1**							
Goodhue	17	10	7	16		1	3	6	2	1	2	2			1			
Red Wing	**5**	**2**	**3**	**5**			**1**	**2**	**1**			**1**						
Grant	6	3	3	6			2	1	1					1				1
Hennepin	188	105	83	183	4	1	32	22	23	29	21	4	7	5	5	11	14	15
Minneapolis	**175**	**97**	**78**	**171**	**4**		**28**	**22**	**22**	**27**	**20**	**4**	**7**	**3**	**5**	**11**	**13**	**13**
Houston	5	2	3	5			1		4									
Hubbard	4	2	2	4			2			1		1						
Isanti	7	4	3	7			1		1	2					1			2
Itasca	14	9	5	11			3	1	1	2	1					2	3	1
Jackson	5	5		5			1		1	1		1	1					
Kanabec	3	3		3				1			2							
Kandiyohi	15	8	7	15			7	2		2	1	1						2
Kittson	6	3	3	6			1	1		1				1	1			1
Koochiching	2		2	2						1								1
Lac qui Parle	12	4	8	12			2	5	1		2	1		1				
Lake	1	1		1														1
Le Sueur	8	6	2	8			2	2	1				1		1		1	
Lincoln	2	2		2			1								1			
Lyon	11	4	7	11			4	1	1	3	1					1		
McLeod	11	5	6	11			2	4	1	2	2							
Mahnomen	3	2	1	1		2				1					2			
Marshall	4	3	1	4			2		1		1							
Martin	6	4	2	6			2		1	1	1							1
Meeker	14	8	6	14			6	1	3	1		2					1	
Mille Lacs	6	4	2	6				1	1	1			1		1			1
Morrison	15	6	9	15			2	2	2	3	2			1	2		1	
Little Falls	**5**	**2**	**3**	**5**					**1**	**1**	**1**				**1**		**1**	
Mower	11	5	6	11			1	3		3		1	1				1	1
Austin	**3**	**1**	**2**	**3**				**1**		**1**		**1**						
Murray	4	3	1	4			3		1									
Nicollet	8	7	1	8			1	1			2			1		1	1	1
Nobles	11	5	6	11			4	1	2	1		1					1	1
Norman	6	4	2	6			1	1	2						1		1	
Olmsted	11	5	6	11			3	2	2	1			1				2	
Rochester	**3**	**1**	**2**	**3**			**2**			**1**								
Otter Tail	29	9	20	29			6	8	1	9		1	1				2	1
Fergus Falls	**9**	**1**	**8**	**9**			**2**	**1**		**5**							**1**	
Pennington	4	3	1	4				2	1	1								
Pine	8	5	3	8			1	1	1	1	1					1	1	1
Pipestone	2	2		2			1	1										
Polk	6	3	3	6			1				1				3	1		
Pope	11	7	4	11			2	2	2	2			1				1	1
Ramsey	113	60	52	112	1		20	17	15	16	10	2	5	7	4	3	5	9
St. Paul	**109**	**56**	**53**	**108**	**1**		**19**	**16**	**15**	**15**	**10**	**2**	**5**	**7**	**4**	**3**	**4**	**9**

PNEUMONIA (BRONCHO) IN 1911

Age													Conjugal Cond.				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid.	Not Given	Minn.	Other U. S.	Foreign	Not Given
1													1				1			
2									1	1			2	2			2	1	1	
3	1				1					1			5		1		4	2		
4	2	2					1	1	1	1	1		8		1	1	8	2	1	2
2	1	1					1	1	1		1		4		3	1	4	1	1	2
5		1							1	1	1		6	1	2		6	2	1	
									1					1				1		
2	2	1	1								1		6		1		6		1	
7	1					1	2	1	2	3	2		9	5	5		8	2	6	
2	1						1	1	2	2			4	3	2		3	2	4	
3	1	2			1			1	3	3	2		7	3	6		6	1	9	
	1	1							3	2	2		2	2	5		1	1	7	
4		1											5				5			
2													2				2			
1			1		1					1	1		2	3			3		2	
1								1					1	1			1		1	
5	2									2	2		7	2	2		7		1	
4	2									1	2	1	6	3	1		6		4	
3		3								1			6	1			6		1	
4													4				4			
8	3		1										12				11	1		
1	1												2				2			
3													3				3			
1	3	2				1		1		4	4		9	3	7		9	4	6	
5	4										2		9		2		9	1	1	
6		1											7				7			
1		2					1	1		1	2		3	2	3		3	3	2	
4	1	1						2	1	3	1		9	3	4		8	2	6	
2							1				2		2	1	2		2	1	2	
							1				1			1	1			1	1	
7	1	1					1		2	3	2		9	7	1		9	2	6	
3		1									1		4		1		4	1		
2							1		1	1	1		3		3		2		4	
87	14	10	6	1	2	1	10	6	17	20	11		128	20	36	4	118	20	42	8
86	14	10	6	1	1	4	10	5	17	18	9		126	19	32	4	116	20	37	7
		1	1						1	1	1		2	1	2		1	2	2	
5										1			3		1		3	1		
4	2									1			6		1		6		1	
6	1	1						3	2	1			10	2	1	1	9	3	1	1
2	1	1			1								5				1	1		
3													3				3			
11		1						1	1	1			12	2	1		11	1	3	
5								1					5	1			5		1	
1		1											2				2			
7	2	1							1	1			10	2			9	1	2	
	1												1				1			
1	1								1	3	2		2	2	4		2	1	5	
					1			1					1	1				1	1	
5	2	1	1					1	1				9	1	1		9	1	1	
3	1			1				1		1	1		6	3	2		6		5	
1	1			1									3				3			
2		1	1										1				4			
3			1					1		1			4	1	1		3	2	1	
5							1			5	3		5	6	3		5	1	8	
1		1							1				5		1		5	1		
7			1				1	1	2		3		8	7			8		7	
3			1						1				4	1			4		1	
3	3	1			1		1		1		1		8	1	2		7	3	1	
	2				1								3				2	1		
1	1	1								1			3			1	3	1		
1			1				1		1	3	1		3	3	2		2	1	5	
1		3				1			1	1	1		8	1	2		7	1	3	
4				1						1			5		1		5		1	
2	2					1		1	1	4			4	5	2		6	1	4	
	1									2			1		2		1		2	
11	2	1				1	1	5	1	1	3		16	9	1		11	9	6	
1						1	1	4		1	1		2	5	2		1	2	6	
2			1								1		3		1					
1	3	2						1			1		6	2			5	3		
2													2				2			
3	1									1	1		4		2		3	1	2	
3	2									2	2		5	6			5	1	5	
58	10	4	1		2	2	6	6	11	10	3		78	13	12		63	18	30	2
56	10	4			2	2	6	6	10	10	3		75	22	12		60	17	30	2

TABLE XXXIX—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Red Lake	1		1	1						1								
Redwood	13	8	5	13			5	2	2	1		2			1			
Renville	9	3	6	9				4	3		2							
Rice	14	9	5	14			1	1	2	2	5	2		1				
Faribault	**13**	**9**	**4**	**13**				**1**	**2**	**2**	**5**	**2**		**1**				
Rock	11	6	5	11			3	3			1		1		2		1	
Roseau	7	3	4	6		1		2	2	1				1		1		
St. Louis	106	53	53	106			22	16	10	11	6	4	4	4	3	3	10	13
Duluth	**37**	**17**	**20**	**37**			**10**	**5**	**3**	**2**	**3**	**1**	**2**	**1**	**1**		**4**	**5**
Hibbing	**11**	**4**	**7**	**11**			**3**	**2**				**1**	**1**		**1**		**1**	**2**
Virginia	**6**	**5**	**1**	**6**			**2**	**1**			**1**				**1**			**1**
Eveleth	**4**	**1**	**3**	**4**			**1**		**1**			**1**		**1**				
Scott	6	4	2	6			1	1	1	1						2		
Sherburne	3	1	2	3					1					1				1
Sibley	11	6	5	11			2	2			1					2	3	1
Stearns	23	12	11	23			8	4	4	2	1						3	1
St. Cloud	**4**	**2**	**2**	**4**			**2**		**1**	**1**								
Steele	5	3	2	5			3	1								1		
Owatonna	**1**	**1**		**1**			**1**											
Stevens	7	5	2	7					3	3								1
Swift	7	4	3	7			1	1	1	1		1				1	1	
Todd	10	8	2	10			3		1	3						1		2
Traverse	4	1	3	4						1	1				1			1
Wabasha	7	5	2	7			1	1			2					1		2
Wadena	5	3	2	5			3	1									1	
Waseca	3	2	1	3			1	1									1	
Washington	6	3	3	6			2	2	1		1							
Stillwater	**1**	**1**		**1**			**1**											
Watonwan	3	2	1	3			1			1	1							
Wilkin	2	2		2			1			1								
Winona	7	4	3	7			2	1	2				1				1	
Winona	**6**	**3**	**3**	**6**			**2**		**2**				**1**				**1**	
Wright	11	6	5	11			4	1		1	2			1			1	1
Yellow Medicine	4	2	2	4			1		2						1			
Total	1076	575	501	1065	5	6	236	167	135	139	85	34	30	26	42	38	68	76

PNEUMONIA (BRONCHO) IN 1911—Continued

Age													Conjugal Cond.				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid.	Not Given	Minn.	Other U. S.	Foreign	Not Given
		1											1				1			
9	1	1							2				11	2			11		2	
4		1						1		1	2		5	2	2		5	1	3	
1		1	2	6	1	2		1					14				10	1	2	1
		1	2	6	1	2		1					13				9	1	2	1
6	2	1					1			1			9	1	1		7	3	1	
6				1									7				6		1	
63	18	5	2		1	1	1	6	2	4	3		92	7	5	2	79	8	16	3
19	6	1	1		1	1		2	1	3	2		29	3	3	2	23	4	9	1
9		1					1						10	1			8	1		2
6													6				6			
4													4				4			
2								1	1	2			3	1	2		3		3	
					1			1			1		1	1	1			1	2	
4	1				1				1	3	1		6	3	2		5	5		1
14	4	1								3	1		19	2	2		18	1	4	
3	1												4				4			
2	1	1		1									5				5			
		1											1				1			
2		3								2			5	1	1		3	2	2	
	2	1	1					1	1	1			4	3			3	1	2	
5	2								1	2			7	1	2		7	1	2	
3	1												4				4			
3			1					1		1	1		5	1	1		4	3		
	1							1	1	1	1		1	2	2		1	2	2	
1								1	1				1	2			1	1	1	
2							1		2		1		2	3	1		2	1	3	
											1				1				1	
1	1									1			2	1			1	1	1	
		1								1			1	1			1		1	
2	1								1	2	1		3	4			3		4	
2									1	2	1		2	4			2		4	
3			1						2	3	2		4	2	5		1	3	4	
3													3	1			3		1	
483	109	69	24	12	14	14	32	50	72	121	75	1	737	177	153	9	665	137	256	18

TABLE XL—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	2	1	1	2			2											
Anoka	5	2	3	5			2		1		1					1		
Becker	3	2	1	3					1								2	
Beltrami	8	6	2	8			1	2	2		2			1				
Bemidji	**4**	**4**		**4**				**2**	**1**					**1**				
Benton	11	7	4	11			1	3	2	1	2				1			1
St. Cloud	**1**		**1**	**1**						**1**								
Big Stone	5	2	3	5			1		2			1		1				
Blue Earth	15	9	6	15			4	3	2		2						1	3
Mankato	**8**	**4**	**4**	**8**			**3**	**1**			**1**						**1**	**2**
Brown	11	5	6	11				2	1	2	2	1		1		1		1
New Ulm	**7**	**4**	**3**	**7**				**1**		**2**	**1**	**1**				**1**		**1**
Carlton	9	5	4	7		2		1	1	2	1					1	1	2
Cloquet	**4**	**4**		**4**				**1**	**1**	**1**							**1**	
Carver	11	8	3	11				3	1	3		1				1		2
Cass	9	2	7	9				2	1	1			1				1	3
Chippewa	8	4	4	8			2		1	3	1							1
Chisago	12	9	3	12			2	2	2	3						1	1	1
Clay	8	4	4	8			2	1	1	1	1						1	1
Clearwater	3	2	1	3			2		1									
Cottonwood	11	6	5	11			3	1		3	1		1		1			1
Crow Wing	11	7	4	11			2	1	2	2				1			1	2
Brainerd	**4**	**3**	**1**	**4**					**1**					**1**			**1**	**1**
Dakota	9	8	1	9			1		1		2	1				1	1	2
Dodge	1		1	1				1										
Douglas	10	6	4	10			2	1	2	1			1	1			1	1
Faribault	15	8	7	15			3	1	4	2	1	1	1					2
Fillmore	10	8	2	10			1	5	1	1			1			1		
Freeborn	9	6	3	9			4			1						1	1	2
Albert Lea	**5**	**5**		**5**			**2**									**1**	**1**	**1**
Goodhue	22	14	8	22			5	4	4	4	2		1					2
Red Wing	**9**	**5**	**4**	**9**			**2**	**1**	**1**	**2**	**1**							**2**
Grant	4	2	2	4						3								1
Hennepin	209	126	83	205	4		53	24	22	25	16	5	7	6	4	6	18	23
Minneapolis	**193**	**115**	**78**	**189**	**4**		**49**	**21**	**18**	**24**	**14**	**5**	**6**	**6**	**4**	**5**	**18**	**23**
Houston	13	4	9	13			2	6	1	1		1			1		1	
Hubbard	4	2	2	4			2	1									1	
Isanti	10	7	3	10			2	1	2	3						1	1	
Itasca	4	3	1	4						1	2	1						
Jackson	9	7	2	9			2	1	2	1	1	1					1	
Kanabec	5	4	1	5				2	1	1				1				
Kandiyohi	14	10	4	14			4	2	2	1		1			1	1	2	
Kittson	5	4	1	5			1	1			1					1	1	
Koochiching	4	2	2	4			1			1								2
Lac qui Parle	10	6	4	10			1		2	1		1			1		3	1
Lake	3	1	2	3			1			1						1		
Le Sueur	8	6	2	8			3	2		1	1							1
Lincoln	2	1	1	2							1						1	
Lyon	2		2	2						1							1	
McLeod	8	5	3	8			1	2	1	2							1	1
Mahnomen	1	1		1						1								
Marshall	14	7	7	14			6	1	2	2	1					1		1
Martin	5	2	3	5			3		2									
Meeker	14	9	5	14			7	1			1				1	1	1	2
Mille Lacs	5	2	3	5				1		1	1		1					1
Morrison	8	6	2	8			7		1									
Little Falls	**1**	**1**		**1**			**1**											
Mower	8	7	1	8			3	2				1				1	1	
Austin	**3**	**3**		**3**			**3**											
Murray	9	8	1	9			3	1	2	1	1						1	
Nicollet	5	3	2	5			2	1								2		
Nobles	5	3	2	5			3		1		1							
Norman	7	2	5	7			2	1		1					2		1	
Olmsted	20	11	9	20			7	5	2	2	1	1					2	
Rochester	**16**	**10**	**6**	**16**			**5**	**4**	**1**	**2**	**1**	**1**					**2**	
Otter Tail	26	13	13	26			3	8	6	3			1	1	1	1	2	
Fergus Falls	**7**	**4**	**3**	**7**				**2**	**2**				**1**	**1**	**1**			
Pennington	3	3		3			1	1		1								
Pine	8	5	3	7		1	2	2			2			1			1	
Pipestone	4	2	2	4			2		1							1		
Polk	13	9	4	13			4	1	2		1			1	2	1		1
Crookston	**6**	**4**	**2**	**6**			**1**	**1**	**1**		**1**				**1**			**1**
Pope	8	7	1	8			1	2	1	2	2							
Ramsey	120	77	43	118	2		25	11	18	10	9	9	6	6	3	8	9	6
St. Paul	**118**	**76**	**42**	**116**	**2**		**24**	**11**	**18**	**10**	**9**	**9**	**6**	**6**	**3**	**8**	**9**	**5**

PNEUMONIA (LOBAR) IN 1911

Age													Conjugal Cond.				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid.	Not Given	Minn.	Other U. S.	Foreign	Not Given
		1						1					1	1			1		1	
				1			1	1	1	1			1	3	1		1	3	1	
1	1			1									3				3			
1			1			1	1	4					3	4	1		1	2	5	
						1		3					1	2	1			1	3	
	1		1	3		2	1		1	1	1		7	2	2		7		4	
			1										1				1			
						1		1		2	1			3	2			1	4	
3						1	2	2	2	3	2		5	4	6		5	3	7	
2						1		2	2	1			3	3	2		3	2	3	
2					1	2	1	1	1	3			3	6	2		4	2	5	
1					1	2	1	1		1			2	5			3	1	3	
1	2		1				1	2	1	1			5	3	1		5	1	3	
	1		1				1	1					3	1			2	1	1	
			1	1			1	4	3	1	3		3	6	2		3	2	6	
1	1			1		2	1	2		1			2	5	1	1	3	3	2	1
		1		2	2			1	1	1			5	3			3	1	4	
					1	2	2	1	2	1	3		2	7	3		1		11	
			1	1		1	1	2		1	1		4	2	2		1	4	3	
							1		1	1				3				1	2	
		1					1		6	2	1		2	9			2	3	6	
		1		1		1	2	1	3	1	1		1	5	2		2	2	7	
				1		1			1	1			2	2			1	2	1	
1				1			1	1	2	2	1		2	3	3	1	3	2	4	
										1					1				1	
	1	1				1		2	3	1	1		3	6	1		2	1	7	
				1		1	4		2	3	4		1	7	7		3	4	8	
						2	1			2	5		2	4	4		1	6	3	
	2			1		1			1	2	2		3	3	3		3	3	3	
	2			1						1	1		3	1	1		2	2	1	
	1			1		1	2	3	3	6	5		4	11	7		3	3	16	
	1						1	2	2	2	1		2	5	2		1	3	5	
				1	1	1		1					2	2			3		1	
16	8	8		11	20	20	26	37	29	19	15		54	113	37	5	58	58	79	14
15	**8**	**8**		**8**	**20**	**19**	**24**	**34**	**26**	**18**	**13**		**49**	**106**	**34**	**4**	**51**	**56**	**73**	**13**
1			1	1	1	1			2	4	2		3	5	3		5	1	7	
						1		1		2			1	2	1			3	1	
1				2	2		1	1		3			7	2	1		3	1	6	
				1	1	1		1					3	1			1	1	2	
2				2				3	1		1		5	2	2		4		5	
	1			1		1				2			2	2	1		3	1	1	
1	1			1	2		1		2	2	4		6	1	3	1	5	1	8	
				2		1	1	1					4	1			1		4	
					1	1			1	1				3	1		1		3	
1		2			1				4	2			4	6			3	3	4	
								3						2	1			1	2	
3					1	1				2	1		3	3	2		1		4	
					1					1			1		1		1		1	
1			1										2				1	1		
1			1	1	1			2	1		1		4	2	2		4	3	1	
							1							1					1	
		1		2			1		5	3	2		4	4	6		3	1	10	
	1	1						1	1	1			2	2	1		2	2	1	
	1		1	1	1	1	1	4	1	2	1		4	8	2		4	5	5	
1							2	1	1				2	1	2		2	1	2	
1		2		1					3	1			4	4			4	1	3	
				1									1				1			
				1	1		1	3			2		2	5	1		2	2	4	
					1		1	1					1	2			1	1	1	
2				1	2	1			1	1	1		4	1	1		3	3	3	
				1			1		1	1	1		2	2	1		1	1	3	
				1			1			1	2		1	3	1		1	2	2	
		1		1	1		1	1	1	1			3	3	1		2	1	4	
3				2	1	1	4	2	2	2	3		6	9	5		5	7	8	
2				**2**	**1**	**1**	**3**	**2**	**2**	**1**	**2**		**5**	**7**	**4**		**3**	**6**	**7**	
3	1	1	1	5		4	3	2	4	3	2		15	8	3		11	9	6	
				1		**2**	**1**	**1**		**1**	**1**		**3**	**4**			**2**	**2**	**3**	
						2		1					1	2			1		2	
1		1			1	1	1	2	1				1	3	1		4	1	3	
					1				1	2			1	2	1		1		3	
1			2	2	2	1	2	1	1	1			10	3			6	2	5	
			1		**1**	**1**	**2**	**1**					**5**	**1**			**2**	**2**	**2**	
		1	1	2	3						1		7	1			6		2	
9	4	5	2	1	12	13	14	19	20	14	2		50	47	20	1	27	35	56	2
9	**4**	**5**	**2**		**12**	**13**	**19**	**18**	**20**	**14**	**2**		**49**	**48**	**20**	**1**	**26**	**35**	**56**	**1**

TABLE XL—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Red Lake	3	2	1	3	....	....	....		....	1	1	....	....	....	....	1	....	....
Redwood	13	8	5	13	....	....	3	....	3	...	1	2	....	1	2	....	1	....
Renville	9	7	2	9	....	....	6	1	1	....	....	....	....	....	....	....	....	1
Rice	21	10	11	21	....	....	4	3	3	2	2	...	1	1	1	2	....	2
Faribault	**11**	**3**	**8**	**11**	....	....	....	**2**	....	**2**	....	....	**1**	**1**	**1**	**2**	....	**2**
Rock	7	3	4	7	....	....	1	...	2	....	....	1	1	...	2	..	....	....
Roseau	5	3	2	5	....	....	1	1	....	2	....	....	....	....	1	....	....	....
St. Louis	113	89	24	113	....	....	14	11	13	15	9	7	2	5	3	10	14	10
Duluth	**58**	**41**	**17**	**58**	....	....	**10**	**8**	**1**	**8**	**3**	**3**	**1**	**3**	**1**	**5**	**9**	**6**
Hibbing	**6**	**6**	...	**6**	....	....	**1**	.	**4**	...			....		**1**	...		....
Virginia	**8**	**7**	**1**	**8**	....	....	....	**1**	**1**	**2**	**1**	..	....	**1**		**1**	**1**	....
Eveleth	**7**	**7**	...	**7**	....	....	**1**	**1**	**1**	**1**	.	**1**	....		...	....	**1**	**1**
Scott	4	2	2	4	....	....	2	....	1	....	1		....		....			....
Sherburne	4	3	1	4	....	....	....	1	1	1	....	1	....		....	....	....	....
Sibley	6	2	4	6	....	....	3	....		...	1	1	....			1	....	....
Stearns	19	9	10	19	....	....	3	3	4	4	2	....	....		1	...	1	1
St. Cloud	**6**	**3**	**3**	**6**	....	....	**2**	....	**1**	....	**1**	....	....		....	....	**1**	**1**
Steele	4	3	1	4	....	....	....	....	1	....	....	....	....		....	1	1	1
Owatonna	**1**	....	**1**	**1**	....	....	....	....	....	....	....	....	....		....	....	**1**	....
Stevens	7	6	1	7	....	....	2	....	2	2	1	....	....		....	....	....	....
Swift	4	3	1	4	....	....	1	1	....	1	....	1	....	....	....	....	....	....
Todd	13	6	7	13	....	....	2	3	3	1	...	2	....	2	....	....	....	....
Wabasha	10	5	5	10	....	....	2	1	....	1	2	....	....	....	....	1	....	3
Wadena	5	2	3	5	....	....	4	1	....	....	....	....	....		....	....	....	....
Waseca	2	1	1	2	....	....	1	....	....	....	....	....	....	1	....	....	....	....
Washington	20	9	11	20	....	....	6	1	2	7	2	1	....	....	....	....	....	1
Stillwater	**7**	**2**	**5**	**7**	....	....	**2**	...	**1**	**3**	..	**1**	....		....	....	....	....
Watonwan	7	5	2	7	....	....	1	2	....	1	2	...		....	....	....	1	....
Wilkin	2	2	...	2	....	....	....	1	....	1	....		....	....	....	....	....	....
Winona	27	19	8	27	....	....	6	5	6	1	2	...	1	....	....	....	3	3
Winona	**13**	**10**	**3**	**13**	....	....	**3**	**2**	**3**	....	**1**	...	**1**	....	....	....	**2**	**1**
Wright	24	11	13	24	....	....	7	5	2	1	4	1	....	....	2	1	1	....
Yellow Medicine	9	4	5	9	....	....	3	1	3	2	....	....	....	....	....	....	....	....
Total	1153	712	441	1144	6	3	266	154	151	140	90	43	26	31	30	52	82	88

PNEUMONIA (LOBAR) IN 1911—Continued

Age													Conjugal Cond				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid	Not Given	Minn.	Other U. S.	Foreign	Not Given
									1	1	1			2	1				3	
		1			2	1		1		4	4		1	7	5		2	1	10	
1							1	3	1	3			1	7	1		2	1	6	
2	1	2		2	3	1	1	1	3	5			16	3	2		9	5	6	1
		2		**2**	**2**	**1**	**1**			**3**			**9**	**1**	**1**		**5**	**4**	**1**	**1**
1		1			2	1			1	1			3	3	1		3	2	2	
1	2			1			1						4	1			4		1	
12	3	5	4	4	7	16	28	17	9	4	4		55	39	11	8	25	19	64	5
5	**2**	**1**	**2**	**2**	**2**	**6**	**14**	**10**	**9**	**3**	**2**		**24**	**22**	**8**	**4**	**10**	**14**	**32**	**2**
1					**2**		**1**	**2**					**6**				**1**		**4**	**1**
1		**2**		**1**	**1**		**2**				**1**		**6**	**1**		1	**3**	**1**	**3**	**1**
						3	**3**			**1**			**2**	**5**				**1**	**6**	
	1			2							1		3		1		3		1	
		1		2						1			2	1	1		2	1	1	
		1		1				1			3		2	3	1		2		4	
2	4		1	2	1	2	2	1	3		1		10	7	2		12	2	5	
1	**2**						**1**	**1**			**1**		**3**	**1**	**2**		**3**	**1**	**2**	
								1	3					4				1	3	
									1					**1**					**1**	
			1	1	1		2		2				3	4			2		5	
		1			1		1		1				2	1	1		2		2	
1	1		1	2	1		2	1	2	1	1		7	4	2		6	1	6	
1					2	1				5	1		3	4	3		3	3	4	
						1			1	3				2	3			2	3	
						2							1	1			1		1	
1				1	2	3	1	1	4	4	3		6	9	5		4	5	11	
				1		**2**		**1**		**1**	**2**		**1**	**4**	**2**		**2**	**1**	**4**	
		1	2		1	1		1	1				3	1			4		3	
	1			1									2				2			
2	1		1	3			3	2	3	6	6		7	15	5		8	8	11	
	1			**1**			**3**	**1**		**2**	**5**		**2**	**8**	**3**		**3**	**4**	**6**	
				3	3		2	3	6	3	4		7	12	5	8	6	10		
1		1	1		2		2	1	1				5	3	1		4	1	4	
83	40	42	26	83	90	100	140	145	154	150	100		435	498	203	17	347	252	531	23

TABLE XLI—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Anoka	5	1	1	5							2				1		2	
Becker	1	1		1			1											
Beltrami	1	3	1	4			2	1	1									
Bemidji	**3**	**2**	**1**	**3**			**1**	**1**	**1**									
Big Stone	1		1	1				1										
Blue Earth	1		1	1						1								
Brown	3	2	1	3			2											1
New Ulm	**3**	**2**	**1**	**3**			**2**											**1**
Carver	2	2		2							1							1
Cass	1	1		1			1											
Chisago	1	1		1			1											
Clay	2	1	1	2				1			1							
Dakota	5	3	2	5			3	1	1									
Douglas	1	1		1					1									
Faribault	4	2	2	4			2	1									1	
Fillmore	6	2	4	6			1	3	1									1
Freeborn	1		1	1														1
Goodhue	1		1	1			1											
Grant	1	1		1								1						
Hennepin	13	7	6	13			1	4	2	1					1	2	1	1
Minneapolis	**11**	**6**	**5**	**11**			**1**	**4**	**2**						**1**	**2**		**1**
Isanti	1	1		1									1					
Jackson	1		1	1					1									
Kandiyohi	1		1	1						1								
Kittson	2		2	2							1					1		
Koochiching	1	1		1			1											
Lac qui Parle	3	1	2	3							1				2			
Le Sueur	3	3		3			1	1							1			
Lincoln	1	1		1												1		
McLeod	2	1	1	2					1									1
Martin	1		1	1				1										
Meeker	1	1		1						1								
Mille Lacs	1	1		1			1											
Morrison	1		1	1					1									
Mower	3	2	1	3				1				1		1				
Austin	**2**	**1**	**1**	**2**								**1**		**1**				
Murray	2		2	2			2											
Nicollet	8	3	5	8			2	1	1							1	2	1
Norman	1	1		1			1											
Olmsted	1		1	1													1	
Otter Tail	5	4	1	5			2	1			1			1				
Fergus Falls	**1**	**1**		**1**			**1**											
Pipestone	2		2	2					1			1						
Polk	2	2		2			1				1							
Pope	1	1		1											1			
Ramsey	22	12	10	22			5	1	4	4	3		1	1	1	2		
St. Paul	**20**	**11**	**9**	**20**			**5**	**1**	**2**	**4**	**3**		**1**	**1**	**1**	**2**		
Renville	8	4	4	8			2		5							1		
Rice	2	1	1	2			1									1		
Roseau	1	1		1													1	
St. Louis	16	8	8	16			2	2	3	2		1		2	3		1	
Duluth	**5**	**1**	**4**	**5**				**1**	**1**	**1**					**2**			
Hibbing	**3**	**1**	**2**	**3**			**1**							**1**			**1**	
Virginia	**4**	**4**		**4**				**1**	**1**			**1**		**1**				
Sherburne	1	1		1				1										
Sibley	2	1	1	2									1			1		
Steele	1	1		1													1	
Owatonna	**1**	**1**		**1**													**1**	
Swift	1		1	1						1								
Todd	1	1		1												1		
Traverse	1	1		1														1
Wabasha	2	1	1	2			1									1		
Waseca	2	2		2			2											
Washington	5	4	1	5				1	1	2		1						
Stillwater	**1**		**1**	**1**								**1**						
Watonwan	2		2	2			1					1						
Winona	2	1	1	2				1		1								
Winona	**2**	**1**	**1**	**2**				**1**		**1**								
Wright	3	2	1	3			1	1									1	
Yellow Medicine	2	1	1	2				1			1							
Total	171	93	78	171	...	....	41	25	23	14	12	6	3	6	10	12	11	8

BRONCHITIS (ACUTE) IN 1911

Age													Conjugal Cond				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid	Not Given	Minn.	Other U. S.	Foreign	Not Given
1		1				1			1	1			2	3			2	2	1	
									1					1				1		
3	1												4				4			
3													3				3			
										1				1					1	
										1				1					1	
2											1		2		1		2		1	
2											1		2		1		2		1	
1										1			1	1			1		1	
1													1				1			
										1					1				1	
1	1												2				2			
3										2			3		2		3		2	
1													1				1			
1								1		1	1		1	2	1		1	2	1	
3									1	2			4		2		3	1	2	
1													1				1			
									1					1				1		
										1				1					1	
4	1	1		1				1		3	2		7	3	3		7	2	1	
4	**1**			**1**				**1**		**2**	**2**		**6**	**2**	**3**		**6**	**2**	**3**	
										1				1					1	
1													1				1			
1													1				1			
	1										1		1		1			1	1	
	1												1				1			
	1					1				1			1	1	1		1	1	1	
								1		1	1			2	1			1	2	
								1						1					1	
										1	1			1	1				2	
	1												1				1			
1													1				1			
											1				1				1	
											1				1				1	
1									1		1		1		2		1	1	1	
									1		**1**				**2**			**1**	**1**	
							1			1				1	1		1		1	
4										2	2		1	1	3		4		4	
1													1				1			
										1					1				1	
4										1			4		1		4	1		
1													**1**				**1**			
	1									1			1		1			1	1	
1	1												2				2			
											1				1				1	
14		1	1						3	3			16	6			15	2	5	
13		**1**	**1**						**2**	**3**			**15**	**5**			**14**	**2**	**4**	
3						1			1	3			3	3	2		3	1	4	
2													2				2			
	1												1				1			
9	3	2								2			14		2		11	1	1	
2	**1**	**1**								**1**			**4**		**1**		**4**	**1**		
2	**1**												**3**				**3**			
2	**1**	**1**											**4**				**4**			
											1				1				1	
							1			1			1	1			1		1	
						1							1					1		
						1							**1**					**1**		
1													1				1			
		1											1					1		
1													1				1			
1											1		1		1		1		1	
1										1			2				1		1	
1		1											5				5			
1													**1**				**1**			
1										1			1		1		1		1	
									1		1			1	1			2		
									1		**1**			**1**	**1**			**2**		
1										1	1		2		1		1		2	
					1					1			1		1				2	
74	13	7	1	1	1	4	2	4	10	37	17		102	33	36		91	23	54	..

TABLE XLII—DEATHS FROM

COUNTY	To-tal	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beltrami	1	1		1						1								
Blue Earth	1	1		1				1										
Carver	4	3	1	4					1	1	1		1					
Chisago	2	1	1	2			1						1					
Faribault	3	1	2	3			1	1		1								
Fillmore	2	2		2			1	1										
Freeborn	3	1	2	3				1			1					1		
Goodhue	4	4		4			2								2			
Grant	1	1		1											1			
Hennepin	12	1	11	12			5	1	2		3							1
Minneapolis	**11**	**1**	**10**	**11**			**5**	**1**	**1**		**3**							**1**
Houston	3	1	2	3			1		1							1		
Isanti	2	1	1	2											1		1	
Jackson	2	1	1	2						1		1						
Lac qui Parle	2	1	1	2												2		
Lincoln	1		1	1												1		
Lyon	2	1	1	2			1		1									
McLeod	2	1	1	2											1			1
Martin	1	1		1							1							
Meeker	2	2		2			1							1				
Mille Lacs	1		1	1			1											
Morrison	1		1	1						1								
Mower	2	1	1	2									1				1	
Austin	**1**		**1**	**1**													**1**	
Norman	1		1	1			1											
Otter Tail	2		2	2				1					1					
Pennington	1		1	1						1								
Pipestone	1		1	1								1						
Polk	1	1		1							1							
Crookston	**1**	**1**		**1**							**1**							
Pope	1		1	1						1								
Ramsey	10	6	4	10			3	1		1	1		1	2	1			
St. Paul	**7**	**4**	**3**	**7**			**2**			**1**	**1**		**1**	**1**	**1**			
Red Lake	1		1	1											1			
Redwood	3	2	1	3				1		1	1							
Renville	4	2	2	4			2	2										
Rice	3	2	1	3				1		1								1
Faribault	**2**	**2**		**2**				**1**		**1**								
St. Louis	3	2	1	3				1	1			1						
Duluth	**2**	**1**	**1**	**2**				**1**				**1**						
Hibbing	**1**	**1**		**1**					**1**									
Sibley	1	1		1									1					
Steele	4	2	2	4				1			1					1	1	
Owatonna	**3**	**2**	**1**	**3**				**1**			**1**					**1**		
Stevens	1		1	1						1								
Todd	1		1	1												1		
Traverse	2	2		2				1			1							
Waseca	2	1	1	2			1					1						
Washington	1	1		1				1										
Winona	1	1		1													1	
Winona	**1**	**1**		**1**													**1**	
Wright	1	1		1			1											
Yellow Medicine	2		2	2			1							1				
Total	101	50	51	101	...	...	23	15	6	11	11	4	6	4	7	7	4	3

BRONCHITIS (CHRONIC) IN 1911

Age													Conjugal Cond				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid.	Not Given	Minn.	Other U. S.	Foreign	Not Given
								1						1					1	
										1					1				1	
										1	3			1	3				4	
								1		1			1	1					2	
									1		2			2	1			1	2	
										1	1			2				1	1	
						1			1	1			1		2			1	2	
										3	1			1	3		1	3		
									1					1					1	
								2	5	3	2			4	8			4	7	1
								1	**5**	**3**	**2**			**3**	**8**			**4**	**7**	
										1	2			2	1				3	
1											1		1		1		1		1	
										2				1	1			1	1	
									1		1			1	1				2	
											1				1				1	
											2			1	1			1	1	
										2				1	1				2	
								1						1					1	
									2			....	1	1					2	
									1					1					1	
										1				1					1	
								1			1			1	1			1	1	
											1				**1**			**1**		
															1				1	
								1		1				1	1			2		
							1							1			1			
							1							1					1	
											1				1				1	
											1				**1**				**1**	
									1						1				1	
								1	4	2	3			4	6			2	8	
								1	**3**	**2**	**1**			**2**	**5**			**1**	**6**	
										1					1				1	
								1		1	1			2	1				3	
									3		1		1	1	2			3	1	
						1				1	1			3			1		2	
						1					**1**			**2**			**1**		**1**	
1							1			1			2	1			1		2	
							1			**1**			**1**	**1**					**2**	
1													**1**				**1**			
											1				1				1	
									1	3				2	2			1	3	
									1	**2**				**1**	**2**			**1**	**2**	
											1				1			1		
										1					1				1	
										1	1			1	1			2		
	1										1		1		1		1	1		
										1					1				1	
											1			1					1	
											1			**1**					**1**	
										1				1				1		
										2					2				2	
2	1					2	3	9	22	33	29		9	43	49		6	26	68	1

TABLE XLIII—DEATHS FROM CANCER IN 1911

COUNTY	To-tal	Sex		Color			Month of Death												Age												
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Aitkin	7	4	3	7			1						1		1	2	2									1	2	3		1	
Anoka	12	6	6	12			2				1	1	1	1		2		4									3	6	2	1	
Becker	11	5	6	11			2		2			1	1	2			2	1							1		3	2	4	1	
Beltrami	8	2	6	8				2			1	1	1		2			1						2		3	1	1	1		
Bemidji	**4**	**2**	**2**	**4**				**1**				**1**			**1**			**1**						**1**		**2**			**1**		
Benton	8	3	5	8			1		1		1	1		1		1	1	1								1	3	2	2		
St. Cloud	**1**		**1**	**1**					**1**																		**1**				
Big Stone	5	2	3	5			1							1		1	1	1							1			3	1		
Blue Earth	34	15	19	34			2	1	4	3	3	4	5	5	1	1	4	1						1	1	3	7	9	9	4	
Mankato	**16**	**5**	**11**	**16**			**1**	**1**	**2**	**1**	**2**	**3**	**1**	**2**	**1**		**2**							**1**	**1**	**2**	**3**	**3**	**4**	**2**	
Brown	12	7	5	12				2	1	1		2		2	2		1	1					1				4	3	1	3	
New Ulm	**6**	**4**	**2**	**6**				**2**	**1**					**1**	**2**												**1**	**2**	**1**	**2**	
Carlton	8	6	2	8			1	1	1	1		1	1				2									1	3	2	2		
Cloquet	**1**	**1**		**1**								**1**															**1**				
Carver	9	5	4	9			2	1		1		1	1		2		1									1	1	4	3		
Cass	1		1	1				1																				1			
Chippewa	12	6	6	12			1		2		1	1	1		3		2	1					2			1	2	3	1	3	
Chisago	16	8	8	16				2	4	1	4	1			1	2	1						1			3		6	5	1	
Clay	11	7	4	11			1		1	1	1	1	1		1	2		2							2	3	2	1	2	1	
Clearwater	4	2	2	4					2		1					1											1	2		1	
Cook	1		1	1										1										1							
Cottonwood	8	2	6	8						1		1	1	3	2												2	4	2		
Crow Wing	9	5	4	9				3		1	1			1		1	2									3	1	4	1		
Brainerd	**5**	**2**	**3**	**5**						**1**	**1**					**1**	**2**									**1**		**3**	**1**		
Dakota	16	5	11	16			1	2	4	1	1	5		1		1										1	3	5	5	2	
Dodge	8	2	6	8				1	1	2			1	1			1	1									1	1	4	2	
Douglas	13	6	7	13			1		1	2	2	1		2	2		1	1								2	3	6	2		
Faribault	15	9	6	15			1	1		3		1	1		1	1	5	1								1	4	4	5	1	
Fillmore	16	7	9	16				2	2	1	1	2	1	1	1	1	2	2							2		7	3	3	1	
Freeborn	12	6	6	12				1	2	1		1		2	1	1	1	2						1		1	4	3	2	1	
Albert Lea	**1**		**1**	**1**								**1**																		**1**	
Goodhue	28	19	9	28			5	2	3		3		1	2	6	2	2	2						1	2	3	7	4	8	3	
Red Wing	**7**	**5**	**2**	**7**			**3**									**2**		**2**							**1**	**2**	**2**	**1**		**1**	
Grant	6	3	3	6			1	1	1			2						1					1				1	1	1	2	
Hennepin	259	114	145	256	3		20	15	21	18	26	19	25	22	16	27	29	21			2			10	19	63	66	53	37	9	
Minneapolis	**242**	**103**	**139**	**239**	**3**		**19**	**14**	**18**	**17**	**25**	**18**	**22**	**22**	**16**	**27**	**24**	**20**			**2**			**9**	**18**	**60**	**64**	**49**	**31**	**9**	
Houston	12	8	4	12							1	1	3	1	4	1		1						1		3	3	1	2	2	
Hubbard	7	1	6	7				1		1	1				1		3								1	1	2	3			
Isanti	7	3	4	7			1	1	2		1				1			1					1			1	1	1	3		

TABLE XLIII—DEATHS FROM CANCER IN 1911—Continued

COUNTY	Conjugal Cond				Birth Place				Occupation																						
	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry.	Miner	Teamster	Teacher	Woodsman	Professional	Mechanic	Mason	Agent	Bar & Hotel	Policeman	Lumbman	Dressmaker	Official	Com'l Trav	Miscellaneous
Aitkin	1	6				4	3		3	3			1																		
Anoka	1	6	5		1	4	6	1	7	5																					
Becker	7	4			1	2	8		7	3											1										
Beltrami		7		1		3	5		5	2															1						
Bemidji		**3**		**1**		**1**	**4**		**3**	**1**																					
Benton		6	2		1	2	5		5	3																					
St. Cloud		**1**				**1**			**1**																						
Big Stone		7	2			1	4		3	2																					
Blue Earth	1	20	9		3	9	22		21	8	1					1			1		1		1								
Mankato	**1**	**10**	**5**		**2**	**3**	**11**		**10**	**1**	**1**					**1**			**1**		**1**		**1**								
Brown	1	5	6		1	1	9	1	9	1	1																		1		
New Ulm		**4**	**2**				**5**	**1**	**5**																				**1**		
Carlton	1	3	1				8		2	6																					
Cloquet		**1**					**1**			**1**																					
Carver		7	2		1		8		1	4															1						
Cass		1				1			1																						
Chippewa	3	5	1		1	3	8		8	3				1																	
Chisago	1	10	5		2		14		10	5											1										
Clay	2	7	2		1	1	6		4	5													1								1
Clearwater		2	2				4		2	2																					
Cook		1			1				1																						
Cottonwood		5	3			2	6		7	1																					
Crow Wing	1	5	3			3	5	1	6	2						1															
Brainerd		**3**	**2**			**1**	**3**	**1**	**4**							**1**															
Dakota	1	8	7		2	5	9		11	5																					
Dodge		3	5			1	7		6	2																					
Douglas	3	8	2		1	1	8		7	5																					1
Faribault		8	7		1	4	10		6	5	2		1	1																	
Fillmore	1	12	3		2	11	3		9	5			1	1																	
Freeborn	1	8	3		3	1	8		6	5												1									
Albert Lea			**1**				**1**		**1**																						
Goodhue	1	20	7		2	9	17		10	11			1	1				1			1		1			1		1			
Red Wing		**6**	**1**			**4**	**3**		**2**	**1**								**1**			**1**		**1**					**1**			
Grant	1	1	1		1		5		3	3																					
Hennepin	37	159	58	5	27	95	131	6	158	22	7	2	12	11	2	5	1	4	3	4	1	9	3	3		2	1	3	3	1	2
Minneapolis	**22**	**157**	**58**	**5**	**25**	**89**	**122**	**6**	**153**	**15**	**6**	**2**	**11**	**11**	**2**	**5**	**1**	**4**	**3**	**4**	**1**	**8**	**3**	**3**		**2**	**1**	**2**	**3**	**1**	**1**
Houston	1	8	3		1	3	8		4	5	1			1																	1
Hubbard		4	3			7			6	1																					
Isanti	1	4	2			1	6		4	3																					

TABLE XLIII—DEATHS FROM CANCER IN 1911—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age												
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Itasca	5	1	4	5				1		1	1			1		1									2		1	2			
Jackson	9	6	3	9			1	1					1	1		1	2	2							2	2	1		4		
Kanabec	2		2	2									1				1									1				1	
Kandiyohi	10	9	1	10					1	1		2		3	2	1									2	1	2	2	3		
Kittson	10	5	5	10			1		1	1	2		1		4											1	5	1	3		
Koochiching	2	1	1	2														2									1	1			
Lac qui Parle	8	4	4	8				1		2		1	1	2				1									1	3	1	3	
Lake	4	1	3	4						2	1							1				1				2		1			
Le Sueur	15	7	8	15				3	2	2		2	1	1	2	2									1	4	3	1	3	3	
Lincoln	3	2	1	3			1						1					1									1	1	1		
Lyon	13	6	7	13			1	1	1	1	1		1	1	2	1	1	2								2	6	3	2		
McLeod	11	5	6	11						2		1	3	1	2	2									1	1	3	3	3		
Mahnomen	2	2		1		1								1				1			1							1			
Marshall	8	4	4	8			1		1	1	1			1		1	1	1							3	2	2			1	
Martin	12	8	4	12					1	2	2			1	2	1	2	1								2	3	6	1		
Meeker	9	6	3	9			3	1		1	2		1					1								2		1	6		
Mille Lacs	2	1	1	2									1	1													1	1			
Morrison	12	8	4	12			2	2	2	1				1	2		2								1	2	3	3	3		
Little Falls	**6**	**3**	**3**	**6**			**2**	**1**						**1**	**1**		**1**									**2**	**1**	**1**	**2**		
Mower	19	10	9	19				2	2	2		1	1	1	2	3	2	3						1		2	1	8	5	2	
Austin	**7**	**6**	**1**	**7**				**1**	**2**	**2**							**2**							**1**		**1**	**1**	**4**			
Murray	5	3	2	5				1		2	1					1											3		2		
Nicollet	10	5	5	10				1		2	1	2			2		2								1	1	1	4	3		
Nobles	9	5	4	9			1	1			1		2	4							1			2	1		2	1	2		
Norman	7	4	3	7			1	2	1				1	1				1							1	1	2	2		1	
Olmsted	84	54	30	83	1		3	4	9	7	3	9	7	5	10	10	8	9						3	3	14	29	20	10	5	
Rochester	**76**	**48**	**28**	**75**	**1**		**2**	**2**	**9**	**7**	**3**	**9**	**5**	**5**	**8**	**9**	**8**	**9**						**3**	**3**	**12**	**28**	**18**	**8**	**4**	
Otter Tail	32	16	16	32			3	2	3	1	3	3	1	3	4	2	1	3							2	2	8	14	4	2	
Fergus Falls	**7**	**2**	**5**	**7**			**1**		**2**		**1**							**3**									**4**	**3**			
Pennington	6	5	1	6										2		3	1									3	2	1			
Pine	7	7		7				1		1		1	2			1	1									1		3	3		
Pipestone	8	4	4	8			1	2		1					1	1		2								2	2	3	1		
Polk	14	11	3	14			3	1	1	2	1	1	1	1			1	2							2	3	3	2	2	2	
Crookston	**5**	**4**	**1**	**5**			**1**	**1**			**1**	**1**		**1**											**1**	**1**	**2**		**1**		
Pope	8	1	7	8			2			1		1		2	1		1									2	3	2	1		
Ramsey	180	77	103	179	1		14	11	13	15	13	16	17	17	11	23	13	17					3	9	14	26	46	46	29	10	
St. Paul	**173**	**72**	**101**	**172**	**1**		**13**	**11**	**13**	**14**	**13**	**16**	**16**	**17**	**9**	**23**	**12**	**16**					**3**	**6**	**14**	**25**	**46**	**43**	**27**	**9**	
Red Lake	3	2	1	3				1	1		1															1	1	1			
Redwood	12	7	5	12			1	1		2	1		1	1		4	1								1	1	3	3	4		

TABLE XLIII—DEATHS FROM CANCER IN 1911—Continued

COUNTY	Conjugal Cond.				Birth Place				Occupation																						
	Single	Married	W & D	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry.	Miner	Teamster	Teacher	Woodsman	Professional	Mechanic	Mason	Agent	Bar & Hotel	Policeman	Lumbman	Dressmaker	Official	Con'l Trav.	Miscellaneous
Itasca		3	2			1	1		4	1																					
Jackson	8	1				4	5		3	6																					
Kanabec		1	1				2		2																						
Kandiyohi		10			1		9		1	8			1																		
Kittson	1	7	2		1	1	8		5	5																					
Koochiching		1	1			1	1		1		1																				
Lac qui Parle		6	2			2	6		4	4																					
Lake	1	2	1		1	1	2		3						1																
Le Sueur		9	6		3	1	11		8	1																1					2
Lincoln		3					3		1	2																					
Lyon	1	12				3	10		6	4	1	1		1																	
McLeod		7	4				11		6	5																					
Mahnomen	1	1			1		1		1	1																					
Marshall	1	6	1		1	1	6		4	4																					
Martin		9	3			3	9		4	6				1									1								
Meeker	1	7	1		1	1	7		3	4	1		1																		
Mille Lacs		2			1	1		1	1																						
Morrison		9	3			1	11		4	6										1					1						
Little Falls		**5**	**1**			**1**	**5**		**3**	**1**										**1**					**1**						
Mower	2	9	8		2	3	14		10	5	1		1									1								1	
Austin	**2**	**4**	**1**		**1**	**2**	**4**		**2**	**2**			**1**									**1**								**1**	
Murray		3	2				5		2	3																					
Nicollet		5	3	2	1		7	2	6	3			1																		
Nobles	2	7			2	3	4		5	2			1																	1	
Norman		5	2		1		6		3	4																					
Olmsted	12	19	22	1	3	45	35	1	28	18	2	1	2	5	2	1		1	1		6	1		2	1		1				12
Rochester	**11**	**46**	**18**	**1**	**2**	**42**	**31**	**1**	**26**	**13**	**2**	**1**	**2**	**5**	**2**	**1**		**1**	**1**		**6**			**2**	**1**		**1**				**12**
Otter Tail	3	19	10		3	5	21		16	12	2												1								1
Fergus Falls		**3**	**4**		**1**	**1**	**5**		**5**	**1**													**1**								
Pennington	1	5				1	5		2	3						1															
Pine		7				1	6			6										1											
Pipestone	1	5	2			3	5		5	3																					
Polk	2	12			2		12		2	8				1		1									1			1			
Crookston		**5**			**1**		**4**		**1**	**1**				**1**		**1**									**1**						
Pope		5	3		1	3	4		7	1																					
Ramsey	28	107	45		13	55	111	1	109	10	11	3	6	6	3	3		1	3		3	5	2	1	3	1			1	2	4
St. Paul	**28**	**103**	**42**		**12**	**53**	**107**	**1**	**107**	**9**	**10**	**3**	**6**	**5**	**3**	**3**		**1**	**3**		**3**	**5**	**2**	**4**	**2**	**1**			**1**	**2**	**3**
Red Lake	1	2					3		1	1				1																	
Redwood	1	11				10	2		5	6				1																	

TABLE XLIII—DEATHS FROM CANCER IN 1911—Continued

COUNTY	Total	Sex		Color			Month of Death												Age												
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Renville	18	11	7	18				1	2	3	2	1	1	2	1	1	2	2				1		1	2	1	5	3	5		
Rice	19	9	10	19			3	1	1	2	1	1	2	5	1		2										4	9	5	1	
Faribault	6	1	5	6			1			1		1	1	1	1												2	3	1		
Rock	6	2	4	6					1		4	1														1	2	2		1	
Roseau	6	1	5	6			3								2			1								2	2	1		1	
St. Louis	73	46	27	73			12	8	5	6	3	4	3	9	3	10	5	5						1	7	17	18	20	7	3	
Duluth	52	35	17	52			9	7	2	6	2	2	3	5	3	7	3	3						1	5	12	14	13	4	3	
Hibbing	4	1	3	4			1									1		1							1		2	1			
Virginia	2	2		2					1								1									1		1			
Eveleth	2	1	1	2					1		1															1	1				
Scott	11	8	3	11				2	1				1		2	2	2	1		1							5	1	3	1	
Sherburne	3	1	2	3								1					1	1			1								2		
Sibley	4	3	1	4				1						1		1		1								1		1	2		
Stearns	25	11	14	25			3	1	2		2	2	4	2	2	3	2	2			1				1	4	8	2	7	2	
St. Cloud	8	2	6	8			1	1	1		1	1			1	1	1									2	3		2	1	
Steele	13	7	6	13			1	1	1	2	1		1	2	2	1		1								2	3	4	4		
Owatonna	8	4	4	8			1	1		1			1	1	1	1		1									1	3	4		
Stevens	4	1	3	4						1			1	1				1									1	2	1		
Swift	6	1	5	6				1		1		2	1		1											2	1	3			
Todd	17	9	8	16		1	1	1		3	2		4	2	2	1		1							1	3	4	3	6		
Traverse	4	2	2	4											2		1	1							1	1	1			1	
Wabasha	12	8	4	12			2		1	2	1		1	1	2	1		1							2		1	4	4	1	
Wadena	5	3	2	5							2		1		1			1									2	1	2		
Waseca	5	4	1	5			1			1			1		1		1										1	2	2		
Washington	15	12	3	15			1	1	2	1	4	1	2			1		2							1		3	3	6	2	
Stillwater	10	7	3	10				1	1	1	2	1	1			1		2							1		2	3	2	2	
Watonwan	5	2	3	5				1		1	1		1	1													1	1	2	1	
Wilkin	1	1		1					1																			1			
Winona	32	15	17	32			6	1	4	7		3	2	3	3		2	1								4	3	16	7	2	
Winona	24	11	13	24			5	1	3	5		2	2	3	1		1	1								4	3	10	5	2	
Wright	18	10	8	18			5	2				1	3	1	1	3		2							1	1	3	7	4	2	
Yellow Medicine	7	2	5	7					1			3	1		1	1										4	2	1			
Total	1425	725	700	1419	5	1	121	102	116	125	108	108	121	131	122	139	121	120	...	1	6	2	9	34	83	220	246	365	272	87	...

TABLE XLIII—DEATHS FROM CANCER IN 1911—Continued

COUNTY	Conjugal Cond				Birth Place				Occupation																						
	Single	Married	W. & D.	Not Given	Minn	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry.	Miner	Teamster	Teacher	Woodsman	Professional	Mechanic	Mason	Agent	Bar & Hotel	Policeman	Lumbman	Dressmaker	Official	Com'l Trav.	Miscellaneous
Renville	2	12	4		2	5	11		8	9															1						
Rice		16	3		1	8	10		10	3			1																		5
Faribault		5	1		1	3	2		5	1																					
Rock	..	5	1			2	1		4	1			1																		
Roseau		5	1			1	5		5	1																					
St. Louis	11	12	14	3		13	60		26	8	11		5		2	1	4	1	2	2	1				3	2	1				1
Duluth	12	24	8	3		12	40		17	3	11		3		2	3	1	1	2	2	1				2	2	1				1
Hibbing		3	1				4		3				1																		
Virginia		1	1				2			1							1														
Eveleth		2					2		1																1						
Scott	2	9			2	2	6	1	3	6	1														1						
Sherburne	1		2		1		2		2	1																					
Sibley		2	2				4		1	3																					
Stearns	2	16	7		4	5	16		15	6				1							1	1		1							
St. Cloud		5	3		1	4	3		6					1								1									
Steele		10	3		2	1	10		6	6														1							
Owatonna		5	3			1	7		4	3														1							
Stevens		3	1			1	3		3	1																					
Swift		4	2		1	2	3		4	1															1						
Todd	2	12	3		1	6	10		8	8	1																				
Traverse		2	2		1		3		2	1																		1			
Wabasha	1	9	2		1	6	5		4	5	1							1							1						
Wadena		4	1			3	2		2	2					1																
Waseca		4	1		1		4		1	4																					
Washington	1	13	1		1	2	12		2	3	1		1		1	2				3								1			1
Stillwater	1	8	1		1	2	7		2		1		1		1	1				2								1			1
Watonwan		3	2			1	4		3	2																					
Wilkin		1				1				1																					
Winona	4	22	6		2	9	21		18	6	3		1			1		1					1			1					
Winona	2	16	6		2	9	13		14	3	2		1			1		1					1			1					
Wright	3	8	7		1	6	11		8	9												1									
Yellow Medicine		6	1			2	5		5	1			1																		
Total	166	908	337	12	111	109	893	12	736	361	49	7	39	33	12	20	6	10	10	11	16	19	11	11	15	8	3	7	5	5	31

TABLE XLIV—DEATHS FROM DIARRHOEAL

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	2	1	1	2						1		1						
Anoka	3	2	1	3				1					1	1				
Becker	9	6	3	9				1				1	2		3	1		1
Beltrami	10	6	4	10			1	1	1				1	3	2			1
Bemidji	**4**	**1**	**3**	**4**			**1**							**1**	**1**			**1**
Benton	8	6	2	8				1				2	1	2	2			
Big Stone	9	4	5	9							1		1	2	3	2		
Blue Earth	5	4	1	5			1	1	1	1		1						
Mankato	**1**	**1**		**1**						**1**								
Brown	17	7	10	17			3	2					1		2	8		1
New Ulm	**1**		**1**	**1**														**1**
Carlton	18	7	11	18			2		1	2	1	3	1	3	2	2	1	
Cloquet	**4**	**3**	**1**	**4**					**1**			**1**		**1**			**1**	
Carver	6	5	1	6					2		1			2		1		
Cass	5	4	1	4		1			1	1				2	1			
Chippewa	9	6	3	9				1			1	2			2	3		
Chisago	11	7	4	11				1	3	1	2	2		1			1	
Clay	7	4	3	7			1					1		1	3	1		
Clearwater	3	2	1	3					1			1		1				
Cook	2	1	1	2										1	1			
Cottonwood	13	6	7	13			1		1	1			2	2	5			1
Crow Wing	11	5	6	11					1		4	1	1	2	2			
Brainerd	**6**	**3**	**3**	**6**							**2**			**2**	**2**			
Dakota	15	9	6	15					1		1	1	1	5	3		2	1
Dodge	2	2		2									1		1			
Douglas	7	2	5	7					1	2			1	1			1	1
Faribault	8	2	6	8									1	4	2	1		
Fillmore	6	4	2	6			1			2			1	1				1
Freeborn	10	5	5	10					3			1	2		2	2		
Albert Lea	**1**		**1**	**1**					**1**									
Goodhue	8	6	2	8					1		1			2	3			1
Red Wing	**3**	**2**	**1**	**3**					**1**					**2**				
Grant	1	1		1										1				
Hennepin	150	86	64	147	3		5	7	7	8	7	8	28	43	14	9	6	8
Minneapolis	**141**	**84**	**63**	**144**	**3**		**5**	**7**	**7**	**8**	**7**	**7**	**27**	**43**	**13**	**9**	**6**	**8**
Houston	5	4	1	5			1	1			1			1	1			
Hubbard	7	3	4	7								1		1	4			1
Isanti	4	1	3	4					1				1	1			1	
Itasca	17	7	10	17					3	2			2	6	2	1	1	
Jackson	4	2	2	4					2		1				1			
Kanabec	1		1	1							1							
Kandiyohi	5	1	5	4			1							1	1	1		1
Kittson	4	2	2	4							1			1	1	1		
Koochiching	6	2	4	6					1			1		1	1	2		
Lac qui Parle	8	8		8				1		1		2		3	1			
Lake	9	4	5	8		1				1	1	1	1	1	2		2	
Le Sueur	6	3	3	6						2	1		1		1		1	
Lincoln	3	2	1	3					1				1		1			
Lyon	8	5	3	8			1		1					1	2		3	
McLeod	3		3	3							1			1		1		
Mahnomen	2	2		1		1								1	1			
Marshall	7	5	2	7				1	1					2		1		2
Martin	10	5	5	10			1		1	1	1	1			4		1	
Meeker	11	6	5	11			1		1			2			3	2	1	1
Mille Lacs	5	1	4	5			1		2					2				
Morrison	11	6	5	11			1				1	1		2	3	1	1	1
Little Falls	**2**	**2**		**2**												**1**	**1**	
Mower	4	2	2	4						1				1	1	1		
Austin	**2**	**1**	**1**	**2**										**1**		**1**		
Nicollet	2	1	1	2											2			
Nobles	3	2	1	3					1			1					1	
Norman	4	3	1	4										1	2		1	
Olmsted	6	3	3	6				3	2	1								
Rochester	**4**	**2**	**2**	**4**				**2**	**2**									
Otter Tail	22	12	10	22			1		2	2	1	3	1	1	2	7	1	1
Fergus Falls	**4**	**2**	**2**	**4**					**1**			**1**				**2**		
Pennington	2	2		2			1							1				
Pine	6	4	2	4	2			1			1	1		1	2			
Pipestone	2	2		2													2	
Polk	6	3	3	6			1	2	1	1						1		
Crookston	**2**	**1**	**1**	**2**			**1**	**1**										

DISEASES, UNDER TWO YEARS OF AGE, IN 1911

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
2													2				2			
3													3				3			
7	2												9				9			
8	2												10				10			
2	2												4				4			
8													8				8			
8	1												9				9			
5													5				5			
1													1				1			
15	2												17				17			
1													1				1			
14	4												18				18			
3	1												4				4			
5	1												6				6			
4	1												5				5			
7	2												9				9			
9	2												11				11			
6	1												7				6	1		
3													3				3			
2													2				2			
9	4												13				13			
9	2												11				11			
5	1												6				6			
13	2												15				15			
	2												2				2			
6	1												7				7			
4	4												8				8			
4	2												6				5	1		
6	4												10				10			
1													1				1			
6	2												8				6	2		
1	2												3				2	1		
1													1				1			
129	21												150				140	9	1	
26	21												147				138	8	1	
4	1												5				5			
7													7				7			
4													4				4			
13	4												17				15	2		
3	1												4				4			
	1												1				1			
5													5				5			
3	1												4				4			
5	1												6				6			
7	1												8				8			
8	1												9				9			
6													6				6			
3													3				3			
6	2												8				7	1		
3													3				3			
2													2				2			
6	1												7				7			
7	3												10				10			
9	2												11				11			
5													5				5			
10	1												11				11			
2													2				2			
4													4				4			
2													2				2			
1	1												2				2			
3													3				3			
2	2												4				3	1		
6													6				5	1		
4													4				4			
18	4												22				22			
2	2												4				4			
1	1												2				2			
6													6				6			
2													2				2			
5	1												6				6			
2													2				2			

TABLE XLIV—DEATHS FROM DIARRHOEAL DISEASES

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Pope	2	1	1	2										1	1			
Ramsey	113	68	45	113			4	10	6	5	11	6	13	21	17	8	6	6
St. Paul	**109**	**65**	**44**	**109**			**3**	**10**	**6**	**5**	**11**	**6**	**12**	**19**	**17**	**8**	**6**	**6**
Red Lake	2	2		2							1				1			
Redwood	9	7	2	8	1		1		1				3	2	2			
Renville	14	8	6	14			1				1	3	1	4	2			2
Rice	8	6	2	8					1	2	1				2	1		1
Faribault	**1**	**1**		**1**											**1**			
Rock	2	1	1	2			1							1				
Roseau	6	5	1	6					1		1	1		3				
St. Louis	193	113	80	193			18	7	7	16	10	12	17	39	36	15	7	9
Duluth	**74**	**40**	**34**	**74**			**4**	**4**	**3**	**7**	**6**	**6**	**3**	**14**	**16**	**4**	**4**	**3**
Hibbing	**18**	**10**	**8**	**18**			**2**	**2**	**1**	**2**			**3**	**2**	**3**	**2**	**1**	
Virginia	**21**	**10**	**11**	**21**			**1**		**1**	**1**	**1**		**4**	**8**	**2**	**2**		**1**
Eveleth	**19**	**12**	**7**	**19**				**1**	**1**	**1**		**2**	**4**	**5**	**2**	**2**		**1**
Scott	5	4	1	5				1						1	1	1		1
Sibley	6	5	1	6					2	1					1	1		1
Stearns	20	13	7	20				1	3	1	2		1	6	1	4	1	
St. Cloud	**5**	**3**	**2**	**5**										**3**		**2**		
Steele	11	9	2	11			1					2	2		3	1	1	1
Owatonna	**4**	**3**	**1**	**4**								**1**			**3**			
Stevens	2		2	2					1						1			
Swift	11	7	4	11			1		1			1	1	2	3		2	
Todd	14	8	6	14				1		2		1	2	2	1	2	2	1
Traverse	1		1	1										1				
Wabasha	3	1	2	3				2							1			
Wadena	4	3	1	4			1						2	1				
Waseca	7	6	1	7									1	2	4			
Washington	4	4		4									1	1	1	1		
Stillwater	**1**	**1**		**1**												**1**		
Watonwan	3	1	2	3					1			1	1					
Wilkin	6	5	1	6				1			1		1	3				
Winona	10	4	6	10					2	1	2	1	1		2	1		
Winona	**4**	**3**	**1**	**4**					**1**		**1**	**1**			**1**			
Wright	11	9	2	11				1	1	2				2	2	1	1	1
Yellow Medicine	6	5	1	6						2				2	2			
Total	1021	598	423	1014	4	3	53	49	72	63	60	67	100	204	174	84	48	47

UNDER TWO YEARS OF AGE IN 1911—Continued

Age													Conjugal Cond.				Pirth Blace			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
2													2				2			
106	7												113				93	19	1	
102	**7**												**109**				**89**	**19**	**1**	
2													2				2			
6	3												9				9			
13	1												14				14			
5	3												8				7	1		
1													**1**				**1**			
2													2				2			
4	2												6				5		1	
168	25												193				188	5		
63	**11**												**74**				**70**	**4**		
16	**2**												**18**				**18**			
19	**2**												**21**				**21**			
15	**4**												**19**				**19**			
4	1												5				5			
5	1												6				6			
18	2												20				20			
4	**1**												**5**				**5**			
8	3												11				11			
4													**4**				**4**			
1	1												2				2			
8	3												11				11			
12	2												14				14			
1													1				1			
3													3				3			
4													4				4			
5	2												7				7			
4													4				3	1		
1													**1**					**1**		
3													3				3			
5	1												6				6			
9	1												10				10			
4													**4**				**4**			
9	2												11				11			
3	3												6				5	1		
867	154												1021				973	45	3	

TABLE XLV—DEATHS FROM DIARRHOEAL DISEASES

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beltrami	2	2	....	2	....	....	1	....	1	....	....	....	....	....	....	....	....	....
Blue Earth	1	1	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Clay	2	1	1	2	....	....	....	....	....	....	....	....	....	1	....	1	....	....
Cottonwood	1	....	1	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Dakota	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....
Faribault	6	3	3	6	....	....	....	....	....	....	....	....	4	2	....	....	....	....
Fillmore	4	2	2	4	....	....	....	....	....	....	1	....	....	2	....	1	....	....
Freeborn	3	....	3	3	....	....	....	....	1	....	....	1	....	1	....	....	....	....
Albert Lea	**2**	....	**2**	**2**	....	....	....	....	**1**	....	....	**1**	....	....	....	....	....	....
Goodhue	2	1	1	2	....	....	....	....	1	....	1	....	....	....	....	....	....	....
Hennepin	9	6	3	9	....	....	....	1	....	1	....	1	3	2	....	....	....	1
Minneapolis	**9**	**6**	**3**	**9**	....	....	....	**1**	....	**1**	....	**1**	**3**	**2**	....	....	....	**1**
Le Sueur	2	1	1	2	....	....	....	....	....	....	....	1	....	1	....	....	....	....
Martin	2	1	1	2	....	....	....	....	....	....	....	....	1	....	....	1	....	....
Mower	1	....	1	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Otter Tail	2	....	2	2	....	....	....	....	....	1	....	....	....	....	1	....	....	....
Polk	1	....	1	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Pope	1	1	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Ramsey	5	2	3	5	....	....	2	....	....	1	....	....	1	....	....	1	....	....
St. Paul	**4**	**2**	**2**	**4**	....	....	**2**	....	....	**1**	....	....	....	....	....	**1**	....	....
Rice	1	1	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Rock	2	2	....	2	....	....	....	....	1	....	....	....	1	....	....	....	....	....
St. Louis	12	6	6	12	....	....	1	....	....	1	....	....	1	1	3	2	2	1
Duluth	**2**	**1**	**1**	**2**	....	....	....	....	....	....	....	....	....	....	**2**	....	....	....
Hibbing	**1**	**1**	....	**1**	....	....	....	....	....	....	....	....	....	....	....	....	....	**1**
Virginia	**1**	....	**1**	**1**	....	....	....	....	....	....	....	....	....	....	....	**1**	....	....
Eveleth	**2**	....	**2**	**2**	....	....	....	....	....	**1**	....	....	....	....	**1**	....	....	....
Stearns	2	....	2	2	....	....	....	....	....	....	....	....	....	....	....	2	....	....
Steele	1	1	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Stevens	1	....	1	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Todd	1	....	1	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....
Wabasha	1	1	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Waseca	1	1	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Washington	2	....	2	2	....	....	....	....	....	....	....	1	....	....	....	....	....	1
Stillwater	**1**	....	**1**	**1**	....	....	....	....	....	....	....	....	....	....	....	....	....	**1**
Wilkin	1	....	1	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Yellow Medicine	1	1	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....
Total	71	35	36	71	....	....	4	2	7	4	3	6	12	12	7	9	2	3

FROM TWO TO FIVE YEARS OF AGE, IN 1911

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
		2											2				2			
		1											1				1			
		2											2				2			
		1											1				1			
		1											1				1			
		6											6				6			
		4											4				3	1		
		3											3				3			
		2											2				2			
		2											2				2			
		9											9				7	1	1	
		9											9				7	1	1	
		2											2				2			
		2											2				2			
		1											1				1			
		2											2				2			
		1											1				1			
		1											1					1		
		5											5				3	1	1	
		4											4				2	1	1	
		1											1				1			
		2											2				1		1	
		12											12				10	2		
		2											2				1	1		
		1											1				1			
		1											1				1			
		2											2				2			
		2											2				2			
		1											1				1			
		1											1				1			
		1											1				1			
		1											1				1			
		1											1				1			
		2											2				2			
		1											1				1			
		1											1				1			
		1											1				1			
	..	71											71	..			62	6	3	

TABLE XLVI—DEATHS FROM TYPHOID FEVER IN 1911

COUNTY	Total	Sex		Color			Month of Death												Age												
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Aitkin	1	1		1												1								1							
Anoka	6	4	2	6			1	2		1	1							1				1	1	4							
Becker	7	5	2	7				1				1			2	2		1			1	3		3							
Beltrami	6	5	1	6			1			1						2	2								4	2					
Bemidji	**4**	**4**		**4**												**2**	**2**								**2**	**2**					
Benton	1	1		1										1									1								
Big Stone	3	2	1	3												2		1							2	1					
Blue Earth	5	2	3	5				1			1	1		1		1							1	3			1				
Mankato	**4**	**2**	**2**	**4**				**1**			**1**			**1**		**1**								**3**			**1**				
Brown	2	1	1	2					1		1													1	1						
New Ulm	**2**	**1**	**1**	**2**					**1**		**1**													**1**	**1**						
Carlton	1	1		1													1							1							
Cloquet	**1**	**1**		**1**													**1**							**1**							
Carver	2	1	1	2						1							1										1	1			
Cass	2		2	2									1		1							1						1			
Chippewa	2	2		2										1	1									1	1						
Chisago	2	2		2												1	1									2					
Clay	9	8	1	9					1	2	1			1	1	1	1	1					2	3	2	1	1				
Clearwater	1	1		1													1							1							
Crow Wing	5	3	2	5					2				2		1								3	1	1						
Brainerd	**5**	**3**	**2**	**5**					**2**				**2**		**1**								**3**	**1**	**1**						
Dodge	1	1		1									1														1				
Faribault	1	1		1								1																1			
Freeborn	3	1	2	3				1			1		1									1	1		1						
Albert Lea	**1**	**1**		**1**				**1**																	**1**						
Goodhue	4	3	1	4						2		1					1						2	2							
Red Wing	**3**	**2**	**1**	**3**						**2**							**1**						**2**	**1**							
Grant	2	2		2										1		1								1	1						
Hennepin	45	26	19	45			2	3	8	3	1	2		2	2	5	12	5	2		1		6	12	13	6	4		1		
Minneapolis	**42**	**25**	**17**	**42**			**2**	**2**	**6**	**3**	**1**	**2**		**2**	**2**	**5**	**12**	**5**	**2**		**1**		**5**	**12**	**11**	**6**	**4**		**1**		
Isanti	1		1	1									1										1								
Itasca	5	4	1	5				1						3	1										4	1					
Kandiyohi	1	1		1			1																	1							
Kanabec	1		1	1													1						1								
Kittson	1		1	1											1									1							
Koochiching	7	6	1	7										3		1	3					1		4	1	1					
Lac qui Parle	4	2	2	4						1				1		1	1					1	1	1	1						
Lake	7	3	4	7						2	1	1	1			1	1						3	4							
Lincoln	1		1	1						1																	1				

TABLE XLVI—DEATHS FROM TYPHOID IN FEVER 1911—Continued

COUNTY	Conjugal Cond				Birth Place				Occupation																					
	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry.	Miner	Teamster	Woodsman	Bar & Hotel	Com'l Trav.	Mason	Agent	Nurse	Painter	Teacher	Mechanic	Dressmaker	Professional	Miscellaneous
Aitkin			1				1						1																	
Anoka	4	2			5		1		2	1						1		1						1						
Becker	7				5	2			4		1	1							1											
Beltrami	2	3		1		2	3	1	1		1								3						1					
Bemidji	2	2				2	2				1								3											
Benton	1				1				1																					
Big Stone		3				2	1		1	1	1																			
Blue Earth	2	1	2		3			2	4															1						
Mankato	1	1	2		2			2	3															1						
Brown	2						2		1																	1				
New Ulm	2						2		1																	1				
Carlton	1						1												1											
Cloquet	1						1												1											
Carver		2					2		1		1																			
Cass	1		1			1	1		2																					
Chippewa	2				1		1			1	1																			
Chisago		2			1	1								1									1							
Clay	6	2	1		5	1	3		2	1	1				1												1			
Clearwater	1				1						1																			
Crow Wing	4	1			2	1	2		4																		1			
Brainerd	4	1			2	1	2		4																		1			
Dodge		1				1				1																				
Faribault		1				1				1																				
Freeborn	2	1			2		1		2							1														
Albert Lea		1					1									1														
Goodhue	3	1			2	2			1	1	1				1															
Red Wing	2	1			2	1			1		1				1															
Grant		2			2					1																	1			
Hennepin	21	18	2	1	17	11	13	4	18	2	4	3	2	1	3	2	1		1		2	2	1							
Minneapolis	23	16	2	1	14	11	13	4	16	1	4	3	2	4	3	2	1		1		2	2	1							
Isanti	1						1		1																					
Itasca	3		2			3	2		1		1					1			2											
Kanabec	1						1												1											
Kandiyohi	1				1				1																					
Kittson		1					1		1																					
Koochiching	5	1		1	1	1	4	1	1		3							1	2											
Lac qui Parle	4				2		2		2													1						1		
Lake	5	2			2	1	4		4		3																			
Lincoln			1			1			1																					

TABLE XLVI—DEATHS FROM TYPHOID FEVER IN 1911—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age													
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Lyon	7	3	4	7			1		2			1		1		1		1					1	3		2	1				
McLeod	1	1		1						1																1					
Mahnomen	1		1	1												1										1					
Marshall	4		4	4			1			1					1			1					1	3							
Martin	1	1		1													1									1					
Meeker	3	1	2	3						1		1				1							2	1							
Mille Lacs	1	1		1						1													1								
Morrison	5	2	3	5				3		1								1				1	1	2		1					
Little Falls	**5**	**2**	**3**	**5**				**3**		**1**								**1**				**1**	**1**	**2**		**1**					
Mower	3	2	1	3			1		1									1				1		1		1					
Austin	**1**		**1**	**1**			**1**															**1**									
Murray	4	2	2	4										1	1	1	1				1	1	1				1				
Nicollet	2		2	2			1				1															1	1				
Nobles	1	1		1									1																1		
Norman	2	2		2						1				1										1			1				
Olmsted	1		1	1													1										1				
Rochester	**1**		**1**	**1**													**1**										**1**				
Otter Tail	8	3	5	8					1			1		1	2	2	1						2	2	1	1	1		1		
Fergus Falls	**7**	**2**	**5**	**7**					**1**					**1**	**2**	**2**	**1**						**2**	**2**	**1**		**1**		**1**		
Pennington	2	1	1	2			2																	2							
Pine	2	1	1	2										1		1							1	1							
Polk	7	3	4	7			1		1						2	1	1	1					3	2	1	1					
Crookston	**3**	**1**	**2**	**3**					**1**						**1**			**1**					**1**		**1**	**1**					
Ramsey	26	18	8	26			4		4	1			1	1	1	2	6	6			1			7	7	6	2	2	1		
St. Paul	**24**	**16**	**8**	**24**			**4**		**3**	**1**			**1**	**1**		**2**	**6**	**6**			**1**			**7**	**5**	**6**	**2**	**2**	**1**		
Red Lake	3	3		3				1								1	1							1	2						
Renville	1	1		1														1								1					
Rice	3	2	1	3											1	1		1					1	1		1					
Faribault	**1**	**1**		**1**											**1**									**1**							
Rock	2	1	1	2					1				1									1	1								
Roseau	2	1	1	2					1		1												1		1						
St. Louis	32	26	6	32			4	4	1	2		3	3	1	3	1	7	3			1		5	14	6	4	1	1			
Duluth	**18**	**15**	**3**	**18**			**3**	**4**		**2**		**2**			**2**		**3**	**2**			**1**			**6**	**5**	**4**	**1**	**1**			
Hibbing	**4**	**4**		**4**									**2**		**1**	**1**								**4**							
Virginia	**3**	**2**	**1**	**3**					**1**					**1**			**1**						**3**								
Eveleth	**1**	**1**		**1**			**1**																**1**								
Stearns	4	3	1	4			1						2			1								1	1	2					
St. Cloud	**2**	**1**	**1**	**2**			**1**						**1**												**1**	**1**					
Swift	2	1	1	2			1									1							1	1							

TABLE XLVI—DEATHS FROM TYPHOID FEVER IN 1911—Continued

COUNTY	Conjugal Cond.				Birth Place				Occupation																				
	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry.	Miner	Teamster	Woodsman	Bar & Hotel	Com'l Trav.	Mason	Agent	Nurse	Painter	Teacher	Mechanic	Dressmaker	Professional	Miscellaneous
Lyon	3	4			3	3	1		1	3																				
McLeod		1			1								1																	
Mahnomen		1			1				1																					
Marshall	3	1			2	1	1		2						1													1		
Martin			1		1																								1	
Meeker	2	1			2	1			2	1																				
Mille Lacs	1				1					1																				
Morrison	4	1			2	2	1		3	1									1											
Little Falls	**4**	**1**			**2**	**2**	**1**		**3**	**1**									**1**											
Mower	2	1			2	1			1	1										1										
Austin	**1**				**1**				**1**																					
Murray	3	1			2	1	1		3		1																			
Nicollet		2					2		2																					
Nobles		1				1				1																				
Norman	1	1			1		1			2																				
Olmsted		1					1		1																					
Rochester		**1**					**1**		**1**																					
Otter Tail	1	4			3	3	2		5	2		1																		
Fergus Falls	**4**	**3**			**3**	**2**	**2**		**5**	**1**		**1**																		
Pennington	2				1		1								1														1	
Pine	2				1	1			1										1											
Polk	6	1			3	2	2		3	1			1		1											1				
Crookston	**2**	**1**				**1**	**2**		**2**				**1**																	
Ramsey	8	16	2		4	11	11		6	3	3		1	3				1	1	1								2	1	4
St. Paul	**7**	**15**	**2**		**4**	**11**	**9**		**6**	**2**	**3**		**1**	**3**				**1**	**1**	**1**								**2**	**1**	**3**
Red Lake	1	2			2		1			2					1															
Renville		1			1																	1								
Rice	2	1			2		1		1																				1	1
Faribault	**1**				**1**																								**1**	
Rock	2				1	1			2																					
Roseau	1	1			1		1		1							1														
St. Louis	19	10	2	1	4	3	25		7		7	1	1	2	4	2	5		1	2										
Duluth	**9**	**6**	**2**	**1**	**1**	**3**	**14**		**2**		**6**	**1**	**1**	**1**	**3**	**2**			**1**	**1**										
Hibbing	**3**	**1**					**4**				**1**						**3**													
Virginia	**3**				**1**		**2**		**2**						**1**															
Eveleth	**1**						**1**		**1**																					
Stearns	2	2			3	1			1	1			1																	1
St. Cloud		**2**			**1**	**1**			**1**																					**1**
Swift	2				1		1		1	1																				

TABLE XLVI—DEATHS FROM TYPHOID FEVER IN 1911—Continued

COUNTY	To-tal	Sex		Color			Month of Death												Age													
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given
Todd	3	1	2	3	....	....	1	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....	1	2	....	....	....	....	....	....	....
Wabasha	1	....	1	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Wadena	1	1	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Waseca	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Washington	4	2	2	4	....	....	1	....	....	....	1	....	1	....	....	....	....	1	....	....	....	....	2	1	....	1	....	....	....	....	....
Stillwater	**3**	**2**	**1**	**3**	....	....	....	....	....	....	**1**	....	**1**	....	....	....	....	**1**	....	....	....	....	**1**	**1**	....	**1**	....	....	....	....	....
Watonwan	2	2	....	2	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	1	....	1	....	....
Wilkin	6	5	1	6	....	....	....	....	....	1	....	....	....	2	1	1	1	....	1	1	....	1	....	....	2	1	....	....	....	....	....
Winona	3	2	1	3	....	....	....	1	....	....	....	....	1	....	....	....	....	1	....	....	....	....	1	....	....	....	....	2	....	....	....
Winona	**1**	**1**	....	**1**	....	....	....	....	....	....	....	....	....	....	....	....	....	**1**	....	....	....	....	**1**	....	....	....	....	....	....	....	....
Wright	2	....	2	2	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	1	....	....	....	1	....	....	....
Yellow Medicine	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....
Total	293	183	110	293	....	....	23	19	24	24	12	13	17	24	23	36	51	27	3	1	5	13	50	93	54	39	21	9	5	....	....

TABLE XLVI—DEATHS FROM TYPHOID FEVER IN 1911—Continued

COUNTY	Conjugal Cond.				Birth Place				Occupation																					
	Single	Married	W.& D.	Not Given	Minn.	Other U. S.	Foreign	Not Given	None	Farmer	Laborer	Domestic	Carpenter	Merchant	Office	Ry.	Miner	Teamster	Woodsman	Bar & Hotel	Com'l Trav.	Mason	Agent	Nurse	Painter	Teacher	Mechanic	Dressmaker	Professional	Miscellaneous
Todd	3	....	....	....	1	2	....	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wabasha	1	....	....	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wadena	....	1	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Waseca	1	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Washington	3	1	....	....	3	....	1	....	2	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Stillwater	**2**	**1**	....	....	**2**	....	**1**	....	**1**	....	**1**	....	....	....	....	....	....	....	**1**	....	....	....	....	....	....	....	....	....	....	....
Watonwan	....	2	....	....	....	2	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wilkin	4	2	....	....	4	....	1	1	3	1	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Winona	1	1	1	....	1	....	2	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Winona	**1**	....	....	....	**1**	....	....	....	**1**	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wright	1	1	....	....	1	1	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Yellow Medicine	....	1	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total	167	106	16	4	109	71	104	9	116	40	31	6	9	10	14	8	6	4	16	4	2	4	2	2	1	1	3	4	4	6

TABLE XLVII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	1		1	1										1				
Anoka	2	1	1	2											2			
Beltrami	3	2	1	3						2								1
Benton	1		1	1							1							
Big Stone	1	1		1							1							
Blue Earth	2		2	2					1				1					
Mankato	**1**		**1**	**1**					**1**									
Carlton	5	3	2	5					1	1			2				1	
Cloquet	**3**	**2**	**1**	**3**						**1**			**2**					
Carver	1	1		1				1										
Cass	2	2		2					1								1	
Chisago	1		1	1						1								
Cook	1	1		1											1			
Cottonwood	7	3	4	7				3		1	2	1						
Crow Wing	1		1	1				1										
Brainerd	**1**		**1**	**1**				**1**										
Dakota	2	2		2							1			1				
Faribault	2	1	1	2				1										1
Fillmore	3	1	2	3				1									2	
Goodhue	7	6	1	7				1			2			1				3
Red Wing	**1**	**1**		**1**														**1**
Grant	1		1	1														1
Hennepin	83	44	39	83			3	6	8	11	14	3	3	7	7	7	7	7
Minneapolis	**77**	**41**	**36**	**77**			**3**	**4**	**8**	**11**	**14**	**3**	**3**	**6**	**6**	**7**	**6**	**6**
Isanti	3	1	2	3				1										2
Itasca	4	3	1	4						1					2			1
Jackson	4	3	1	4			1		1	1								1
Kanabec	1		1	1													1	
Kittson	1	1		1						1								
Lac qui Parle	1	1		1									1					
Lake	1	1		1			1											
Le Sueur	2	2		2			1	1										
Lyon	2	1	1	2			1		1									
McLeod	1		1	1											1			
Marshall	3	2	1	3					1		1					1		
Martin	4	2	2	4					1							1		2
Meeker	1	1		1					1									
Morrison	1		1	1			1											
Little Falls	**1**		**1**	**1**			**1**											
Mower	2		2	2						1				1				
Austin	**2**		**2**	**2**						**1**				**1**				
Nobles	1		1	1					1									
Norman	2		2	2			1		1									
Olmsted	6	2	4	6				1						1			3	1
Rochester	**6**	**2**	**4**	**6**				**1**						**1**			**3**	**1**
Otter Tail	8	7	1	8			1				6			1				
Pennington	4	2	2	4				1	1		2							
Pine	5	4	1	5						1			1	1	1		1	
Pipestone	2		2	2									1	1				
Polk	4	3	1	4					1			1					1	1
Crookston	**2**	**2**		**2**													**1**	**1**
Ramsey	72	44	28	72			10	6	7	4	4	8	6	9	4	4	6	4
St. Paul	**69**	**41**	**28**	**69**			**10**	**6**	**7**	**3**	**4**	**8**	**6**	**9**	**4**	**4**	**4**	**4**
Red Lake	7	5	2	7			1	3		2								1
Redwood	8	4	4	8				1	1	2	1	1		2				
Renville	3	3		3					2		1							
Rice	2	1	1	2						1						1		
Faribault	**1**		**1**	**1**												**1**		
St. Louis	23	18	5	23			4	6	1		1	3	1	1	2	2	1	1
Duluth	**14**	**12**	**2**	**14**			**2**	**5**				**3**	**1**		**1**	**1**	**1**	
Hibbing	**2**	**2**		**2**			**1**		**1**									
Eveleth	**1**	**1**		**1**														**1**
Scott	1	1		1													1	
Sherburne	2	2		2			1								1			
Sibley	3	1	2	3			2	1										
Stearns	5	2	3	5						2	1	1		1				
St. Cloud	**2**	**1**	**1**	**2**							**1**	**1**						
Steele	2	2		2			1				1							
Owatonna	**1**	**1**		**1**							**1**							

DIPHTHERIA IN 1911

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
					1									1			1			
			1		1								2				2			
			2			1							3				2	1		
				1									1					1		
		1											1				1			
			1		1								1	1			1	1		
			1										1				1			
1		1	1	1	1								4	1			4	1		
1		**1**	**1**										**3**				**3**			
				1									1				1			
			1	1									2				1	1		
				1									1				1			
		1											1				1			
		3	4										7				7			
1													1				1			
1													**1**				**1**			
		1	1										2				2			
1		1											2				2			
	1	1	1										3				3			
1	1		2	1	2								6	1			7			
					1									**1**			**1**			
	1												1				1			
4	5	34	25	10	2	3							79	4			60	14	8	1
2	**5**	**32**	**24**	**10**	**2**	**2**							**73**	**4**			**55**	**13**	**8**	**1**
	1			1	1								3				3			
2	1	1											4				4			
		2	1	1									4				3	1		
			1										1				1			
1													1				1			
	1												1				1			
					1									1					1	
			2										2				2			
	1	1											2				2			
			1										1				1			
	1		1		1								3				2		1	
		1		2			1						3	1			3	1		
1													1				1			
	1												1				1			
	1												**1**				**1**			
	1	1											2				2			
	1	**1**											**2**				**2**			
			1										1					1		
	1												2				2			
		2	3		1								6				5	1		
		2	**3**		**1**								**6**				**5**	**1**		
		3	1	3	1								8				7	1		
		2	1	1									4				4			
		1	2	1	1								4	1			3	2		
		1		1									2				2			
	1	1	2										5				4			
			2										**2**				**2**			
6	10	21	19	13	3								71	1			26	39	7	
6	**10**	**20**	**19**	**12**	**2**								**68**	**1**			**24**	**38**	**7**	
1	1	3	2										7				5	2		
1		4		3									8				7		1	
	1		1	1									3				3			
				2									2				2			
				1									**1**				**1**			
1	2	7	7	4	2								23				18	1	4	
1		**3**	**4**	**4**	**2**								**14**				**9**	**1**	**4**	
		1	**1**										**2**				**2**			
	1												**1**				**1**			
			1										1				1			
		2											2				2			
1	1	1											3				3			
		2	2	1									5				4	1		
		1	**1**										**2**				**1**	**1**		
		1			1								2				2			
		1											**1**				**1**			

TABLE XLVII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Stevens	2	2	....	2	....	....	....	....	....	....	....	....	....	....	....	....	1	1
Swift	1	1	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Todd	2	....	2	2	....	....	....	....	....	....	....	....	1	....	1	....	....	....
Wabasha	2	2	....	2	....	....	....	....	1	....	....	....	....	1	....	....	....	....
Waseca	1	....	1	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Washington	4	3	1	4	....	....	....	....	....	....	....	....	2	....	....	....	....	2
Watonwan	1	1	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Wilkin	1	1	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Winona	3	2	1	3	....	....	....	....	....	....	1	....	1	1	....	....	....	....
Winona	**1**	**1**	....	**1**	....	....	....	....	....	....	....	....	....	**1**	....	....	....	....
Wright	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....
Total	335	199	136	335	....	....	29	36	33	32	39	18	21	31	22	16	27	31

DIPHTHERIA IN 1911—Continued

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
....	....	....	1	1	....	..	....	....	....	....	....	....	2	..	....	..	2	....	....	....
1	....	....	..	..	....	....	....	....	....	....	....	....	1	.	..	....	1	....	....	....
....	....	....	....	2	....	....	....	....	....	....	....	....	1	1	....	....	2	....	....	....
1	....	....	1	..	....	....	....	....	....	....	....	....	2	..	....	....	2	....	....	....
....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....
....	....	....	2	2	....	....	....	....	....	....	....	....	4	....	..	....	4	..	....	....
....	....	....	1	.	....	....	....	....	....	....	....	....	1	....	....	....	1	..	....	....
....	....	....	.		1	....	....	....	....	....	....	....	1	....	....	....	..	1	....	....
....	....	....	2	.	....	1	....	....	....	....	....	....	3	....	....	....	3	....	..	....
....	....	....	....	..	..	1	....	....	....	....	....	....	1	....	....	....	1	....	..	..
....	....	....	....	1	....	..	....	....	....	....	....	....	1	....	....	....	1	....	..	
24	33	99	94	58	21	5	1	....	....	....	....	....	322	13	....	....	242	70	22	1

TABLE XLVIII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Anoka	3	1	2	3	....	....	....	....	2	....	....	....	....	1	....	....	....	....
Becker	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Beltrami	3	1	2	3	....	....	....	1	1	....	1	....	....	....	....	....	....	....
Bemidji	**1**	....	**1**	**1**	....	....	....	....	**1**	....	....	....	....	....	....	....	....	....
Blue Earth	2	2	....	2	....	....	1	....	1	....	....	....	....	....	....	....	....	....
Mankato	**1**	**1**	....	**1**	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Brown	6	2	4	6	....	....	....	....	2	1	....	2	....	....	....	....	....	1
New Ulm	**2**	....	**2**	**2**	....	....	....	....	....	....	....	**1**	....	....	....	....	....	**1**
Carver	4	3	1	4	....	....	2	....	1	....	1	....	....	....	....	....	....	....
Cass	1	1	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Chisago	1	1	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Clay	1	1	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....
Dakota	3	1	2	3	....	....	2	....	....	....	....	....	....	1	....	....	....	....
Dodge	1	1	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Faribault	2	2	....	2	....	....	....	1	....	....	1	....	....	....	....	....	....	....
Fillmore	7	6	1	7	....	....	....	1	1	2	....	1	....	2	....	....	....	....
Freeborn	1	....	1	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Goodhue	4	3	1	4	....	....	1	....	2	1	....	....	....	....	....	....	....	....
Red Wing	**1**	**1**	....	**1**	....	....	**1**	....	....	....	....	....	....	....	....	....	....	....
Grant	1	1	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Hennepin	18	9	9	18	....	....	2	4	3	....	2	....	2	....	1	1	1	2
Minneapolis	**18**	**9**	**9**	**18**	....	....	**2**	**4**	**3**	....	**2**	....	**2**	....	**1**	**1**	**1**	**2**
Houston	2	....	2	2	....	....	....	1	1	....	....	....	....	....	....	....	....	....
Hubbard	1	....	1	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Jackson	1	1	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Kandiyohi	3	2	1	3	....	....	....	1	1	....	1	....	....	....	....	....	....	....
Kittson	1	....	1	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Koochiching	3	2	1	3	....	....	1	1	....	....	1	....	....	....	....	....	....	....
Lac qui Parle	5	3	2	5	....	....	....	....	....	2	1	....	....	....	....	1	....	1
McLeod	2	1	1	2	....	....	2	....	....	....	....	....	....	....	....	....	....	....
Mille Lacs	2	1	1	2	....	....	....	....	2	....	....	....	....	....	....	....	....	....
Morrison	2	1	1	2	....	....	....	....	1	....	....	1	....	....	....	....	....	....
Mower	5	4	1	5	....	....	....	....	....	....	1	....	1	....	1	....	....	2
Austin	**2**	**2**	....	**2**	....	....	....	....	....	....	**1**	....	....	....	**1**	....	....	....
Murray	2	....	2	2	....	....	....	2	....	....	....	....	....	....	....	....	....	....
Nobles	3	1	2	3	....	....	....	....	....	1	1	....	1	....	....	....	....	....
Norman	1	1	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Olmsted	8	4	4	8	....	....	....	....	2	....	2	....	....	....	1	....	2	1
Rochester	**5**	**3**	**2**	**5**	....	....	....	....	**1**	....	**1**	....	....	....	**1**	....	**1**	**1**
Pennington	2	....	2	2	....	....	....	....	1	....	1	....	....	....	....	....	....	....
Pine	3	2	1	3	....	....	....	....	....	....	1	....	....	....	....	2	....	....
Pipestone	1	1	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Ramsey	34	20	14	34	....	....	7	6	5	1	....	1	....	2	3	2	....	7
St. Paul	**34**	**20**	**14**	**34**	....	....	**7**	**6**	**5**	**1**	....	**1**	....	**2**	**3**	**2**	....	**7**
Redwood	3	1	2	3	....	....	1	....	1	....	....	....	....	....	....	....	1	....
Rice	5	5	....	5	....	....	1	2	....	....	1	....	....	....	1	....	....	....
Faribault	**3**	**3**	....	**3**	....	....	**1**	**1**	....	....	....	....	....	....	**1**	....	....	....
Rock	2	1	1	2	....	....	....	....	....	2	....	....	....	....	....	....	....	....
Roseau	3	1	2	3	....	....	....	....	2	1	....	....	....	....	....	....	....	....
St. Louis	12	7	5	12	....	....	2	....	2	1	....	3	....	1	1	....	1	1
Duluth	**7**	**4**	**3**	**7**	....	....	**1**	....	**2**	**1**	....	....	....	**1**	**1**	....	....	**1**
Hibbing	**2**	**2**	....	**2**	....	....	....	....	....	....	....	**2**	....	....	....	....	....	....
Virginia	**1**	....	**1**	**1**	....	....	....	....	....	....	....	....	....	....	....	....	**1**	....
Eveleth	**1**	....	**1**	**1**	....	....	**1**	....	....	....	....	....	....	....	....	....	....	....
Scott	1	....	1	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Sibley	4	3	1	4	....	....	2	1	....	....	1	....	....	....	....	....	....	....
Stearns	2	1	1	2	....	....	....	2	....	....	....	....	....	....	....	....	....	....
Steele	3	2	1	3	....	....	....	....	....	....	....	....	....	....	....	....	1	2
Todd	1	1	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Traverse	1	....	1	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Wabasha	4	1	3	4	....	....	3	....	....	....	....	....	....	....	....	1	....	....
Winona	8	3	5	8	....	....	2	....	1	1	....	1	1	....	....	....	1	1
Winona	**7**	**3**	**4**	**7**	....	....	**2**	....	**1**	**1**	....	**1**	....	....	....	....	**1**	**1**
Wright	1	1	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Total	190	106	84	190	....	....	31	27	33	15	20	10	5	7	9	7	7	19

SCARLET FEVER IN 1911

Age													Conjugal Cond				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D	Not Given	Minn.	Other U. S.	Foreign	Not Given
		2		1									3				3			
			1										1					1		
		1	1	1									3				1	1	1	
				1									1				1			
				1	1								2				2			
					1								1				1			
1	2		2		1								5	1			6			
1					1								1	1			2			
	1	1	1	1									1				4			
			1										1				1			
			1										1				1			
		1											1				1			
		2		1									3				3			
		1											1				1			
		2											2				2			
1		2		1									7				5	1	1	
				1									1				1			
		1	1	1	1								4				4			
		1											1				1			
				1									1				1			
1	1	6	6	2	1	1							18				14	3	1	
1	**1**	**6**	**6**	**2**	**1**	**1**							**18**				**14**	**3**	**1**	
			2										2				2			
				1									1				1			
		1											1				1			
	1	1		1									3				3			
			1										1				1			
	1	1	1										3				3			
1	1	2	1										5				5			
		1		1									2				2			
		1	1										2				2			
		1		1									2				2			
	1	1	2	1									5				5			
			2										**2**				**2**			
		1	1										2				2			
		1	2										3				2	1		
		1											1				1			
	2	3	2	1									8				7	1		
	2	**1**	**1**	**1**									**4**				**4**	**1**		
		1		1									**5**					2		
			2	1									3				2		1	
		1											1				1			
	1	16	6	5	3	2			1				32	2			9	21	4	
	1	**16**	**6**	**5**	**3**	**2**			**1**				**32**	**2**			**9**	**21**	**4**	
		2		1	1								2	1			3			
			1	3						1			4		1		2	2	1	
			1	**2**									**3**				**1**	**2**		
			1	1									2				1	1		
		1	2										3				3			
1	2	1	1	2	2								11	1			6	2	4	
1	**1**	**1**	**1**	**1**	**2**								**6**	**1**			**3**	**2**	**2**	
	1		**1**										**2**				**1**		**1**	
				1									**1**						**1**	
			1										**1**				**1**			
		1											1					1		
		1	1	1	1								4				4			
	1	1											2				2			
	1		1	1									3				3			
			1										1				1			
				1									1					1		
		1		2			1						3	1			4			
	1	1	5	1									8				7	1		
	1	**1**	**5**										**7**				**6**	**1**		
		1											1				1			
5	11	63	51	40	11	3	1		1	1			183	6	1		138	39	13	....

TABLE XLIX—DEATHS

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	1	1		1			1											
Becker	1	1		1			1											
Beltrami	1		1	1				1										
Bemidji	1		1	1				1										
Benton	1	1		1					1									
Brown	1	1		1							1							
New Ulm	1	1		1							1							
Carlton	3	3		3					1	1	1							
Cloquet	2	2		2					1		1							
Clearwater	1	1		1					1									
Dodge	1		1	1						1								
Douglas	1	1		1								1						
Faribault	2	1	1	2					1	1								
Freeborn	3	2	1	3					1		1	1						
Albert Lea	1	1		1					1									
Goodhue	1	1		1			1											
Hennepin	6	3	3	6					1	2	1	1	1					
Minneapolis	5	3	2	5					1	1	1	1	1					
Hubbard	1		1	1							1							
Jackson	4	3	1	4				1	1		2							
Kittson	1	1	3	4			1	1			2							
Koochiching	1	1		1							1							
Lac qui Parle	1		1	1									1					
Le Sueur	1		1	1						1								
Lyon	3	2	1	3					1				1			1		
Marshall	1	1		1						1								
Martin	3	1	2	3			1		1	1								
Meeker	1	1		1							1							
Morrison	1		1	1						1								
Little Falls	1		1	1						1								
Mower	3	1	2	3					2	1								
Austin	2	1	1	2					1	1								
Murray	3	2	1	3						2	1							
Nobles	12	4	8	12					5	3	4							
Olmsted	1		1	1						1								
Otter Tail	2	1	1	2							2							
Fergus Falls	1		1	1							1							
Pipestone	1	1		1								1						
Polk	1	1		1								1						
Pope	1		1	1							1							
Red Lake	3	2	1	3				1						1	1			
Redwood	1	1		1								1						
Renville	2		2	2						1		1						
Rice	13	3	10	13				2	1		8	1		1				
Faribault	10	2	8	10							8	1		1				
Rock	3	3		3					2	1								
St. Louis	3	2	1	3				1	1			1						
Duluth	1	1		1				1										
Sibley	1	1		1							1							
Stearns	1		1	1							1							
St. Cloud	1		1	1							1							
Steele	6	2	4	6						3	1	2						
Owatonna	3		3	3						2		1						
Stevens	3	3		3					1		1		1					
Waseca	2	1	1	2						1		1						
Wright	4	4		4							1	2	1					
Yellow Medicine	2	2		2								1						1
Total	112	60	52	112			6	7	21	22	32	15	5	2		1		1

FROM MEASLES IN 1911

Age													Conjugal Cond.				Birth Place			
Under 1 Year	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	Div. or Wid	Not Given	Minn.	Other U. S.	Foreign	Not Given
					1								1				1			
		1											1				1			
1													1				1			
1													1				1			
	1												1				1			
		1											1				1			
		1											1				1			
		2	1										3				3			
		2											2				2			
		1											1				1			
		1											1				1			
	1												1				1			
1			1										2				2			
2		1											3				3			
1													1				1			
		1											1				1			
4			1	1									6				5	1		
3			1	1									5				4	1		
1													1				1			
1	1	1			1								4				2	2		
	3			1									1				4			
		1											1						1	
	1												1				1			
1													1				1			
		2				1							2	1			1	2		
1													1				1			
1			1	1									3				3			
	1												1				1			
			1										1				1			
			1										1				1			
	2	1											3				3			
	2												2				2			
1				1			1						2	1			1	2		
5	2	3	1	1									12				10	2		
				1									1				1			
	1					1							1	1			1	1		
						1								1				1		
				1									1				1			
				1									1				1			
1													1				1			
	1			2									3				3			
1													1				1			
1		1											2				2			
1		1	3	1	2	2							12	1			10	1	2	
1		1	2	3	2	1							10				9		1	
1	1	1											3				3			
1	2												3				3			
	1												1				1			
	1												1				1			
					1								1				1			
					1								1				1			
1		2	1		1	1							5	1			5	1		
1		1	1										3				3			
2				1									3				3			
1				1									2				2			
2	1	1											4				1			
1	1												2				2			
32	20	22	10	16	6	5	1						107	5			97	12	3	

TABLE L—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Anoka	3	2	1	3			1	1	1									
Becker	1	1		1								1						
Beltrami	1		1	1													1	
Bemidji	**1**	**1**		**1**													**1**	
Brown	1		1	1														1
Carlton	1		1	1			1											
Carver	1		1	1									1					
Clay	2	2		2										1			1	
Clearwater	1	1		1														1
Dakota	1	1		1			1											
Douglas	1	1		1								1						
Fillmore	1	1		1									1					
Goodhue	2	2		2									1	1				
Red Wing	**2**	**2**		**2**									**1**	**1**				
Hennepin	61	30	31	60	1		3	6	8	15	10	4	6	5	1	2		1
Minneapolis	**53**	**26**	**27**	**52**	**1**		**3**	**6**	**6**	**13**	**10**	**3**	**5**	**3**	**1**	**2**		**1**
Isanti	3	3		3										1				2
Itasca	2	2	1	3					1		1					1		
Kanabec	1	1		1													1	
Kandiyohi	4	1	3	4					1								2	1
Kittson	1		1	1				1										
Lac qui Parle	2	2		2									1			1		
Le-Sueur	3	3		3			1	1						1				
Lyons	6	2	4	6				1	2		1	2						
McLeod	1		1	1													1	
Martin	1		1	1													1	
Mille Lacs	4		4	4									1	2	1			
Mower	1		1	1														1
Austin	**1**		**1**	**1**														**1**
Murray	1		1	1												1		
Nicollet	3	1	2	3												1		2
Nobles	1		1	1														1
Olmsted	2	1	1	2										1			1	
Rochester	**1**	**1**		**1**													**1**	
Otter Tail	2	2		2				1			1							
Pine	2		2	2					1			1						
Pipestone	1	1		1							1							
Polk	1	1		1													1	
Ramsey	26	16	10	26			2	2	2	1	4	1	7	2	1		1	2
St. Paul	**24**	**14**	**10**	**24**			**2**	**1**	**3**	**1**	**3**	**1**	**7**	**2**	**1**		**1**	**2**
Redwood	1	1		1										1				
St. Louis	7	4	3	7			2				1	1	1	2				
Duluth	**1**		**1**	**1**										**1**				
Hibbing	**1**	**1**		**1**			**1**											
Virginia	**3**	**2**	**1**	**3**			**1**				**1**		**1**					
Scott	2		2	2											1	1		
Sherburne	1	1		1													1	
Stearns	1		1	1				1										
Steele	1		1	1							1							
Stevens	1	1		1								1						
Todd	1	1	1	2							1		1					
Traverse	1		1	1											1			
Wabasha	2		2	2					1									1
Wadena	1		1	1				1										
Washington	3	1	2	3								1	2					
Stillwater	**2**	**1**	**1**	**2**									**2**					
Watonwan	3	1	2	3									2	1				
Winona	6	3	3	6						1		1	1			1		2
Winona	**5**	**3**	**2**	**5**						**1**			**1**			**2**		**2**
Wright	2	1	1	2							1					1		
Total	180	92	88	179	1		11	15	18	17	22	14	25	17	5	9	12	15

WHOOPING COUGH IN 1911

Age													Conjugal Cond.				Birth Place			
Und 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
1	2												3				3			
1													1				1			
1													1				1			
1													1				1			
	1												1				1			
1													1				1			
1													1				1			
2													2				2			
1													1					1		
1													1				1			
1													1				1			
1													1					1		
1			1										2				2			
1			1										2				2			
44	13	2	2										61				59	1	1	
37	**12**	**2**	**2**										**53**				**51**	**1**	**1**	
3													3				3			
2	1												3				3			
	1												1				1			
3	1												4				4			
1													1				1			
	1	1											2				2			
	2	1											3				3			
5		1											6				5	1		
1													1				1			
1													2	1			1			
4													1				4			
1													1				1			
1													1				1			
	1												1				1			
1	1	1											3				3			
1													1				1			
1			1										2				2			
1													1				1			
2																	2			
	1		1										2				2			
1													1				1			
1													1				1			
11	8	4	3										26				24	1		1
10	**7**	**4**	**3**										**24**				**22**	**1**		**1**
1													1				1			
7													7				6		1	
1													1				1			
1													1				1			
3													**3**				**3**			
	1	1											2				2			
1													1				1			
1													1				1			
1													1				1			
1													1				1			
2													2				2			
1													1				1			
1	1												2				1	1		
	1												1				1			
3													3				3			
2													**2**				**2**			
	2		1										3				3			
3		2	1										6				6			
2		**2**	**1**										**5**				**5**			
2													2				2			
119	38	13	10										180				171	6	2	1

TABLE LI—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Cass	1	1		1										1				
Hennepin	2	1	1	2							1	1						
Minneapolis	2	1	1	2							1	1						
Martin	1	1		1														1
Ramsey	2	1	1	2					1								1	
St. Paul	2	1	1	2					1								1	
Watonwan	1		1	1														1
Total	7	4	3	7					1		1	1		1			1	2

TABLE LII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Anoka	1		1	1												1		
Blue Earth	1		1	1					1									
Brown	1		1	1										1				
Clay	3	2	1	3			1	1				1						
Cottonwood	1	1		1								1						
Crow Wing	1	1		1									1					
Douglas	1	1		1												1		
Hennepin	6	4	2	6					1	2		1	2					
Minneapolis	4	2	2	4					1	2			1					
Houston	1	1		1												1		
Itasca	1	1		1				1										
Kanabec	1		1	1											1			
Kandiyohi	1		1	1				1										
Koochiching	1		1	1									1					
Lincoln	1	1		1													1	
Lyons	1	1		1											1			
Martin	1	1		1							1							
Nobles	1	1		1												1		
Olmsted	1	1		1				1										
Pine	3		3	3								1	1			1		
Ramsey	8	3	5	7	1		1			2			1		2		1	1
St. Paul	8	3	5	7	1		1			2			1		2		1	1
Red Lake	1		1	1													1	
Renville	1	1		1					1									
Rock	1		1	1											1			
St. Louis	12	3	9	12								1	4	3	2	1	1	
Duluth	3		3	3									1			1	1	
Hibbing	1		1	1									1					
Virginia	3	1	2	3									1	2				
Sherburne	1	1		1							1							
Todd	1		1	1			1											
Traverse	1	1		1											1			
Wabasha	1	1		1													1	
Washington	1		1	1												1		
Winona	1		1	1					1									
Yellow Medicine	2		2	1		1							1					1
Total	59	26	33	57	1	1	3	4	4	4	2	5	11	4	8	7	5	2

SMALL POX IN 1911

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
										1					1			1		
1					1								2				1		1	
1					**1**								**2**				**1**		**1**	
								1						1					1	
1									1				1	1			1	1		
1									**1**				**1**	**1**			**1**	**1**		
									1					1					1	
2					1			1	2	1			3	3	1		2	2	3	

ANTERIOR POLIOMYELITIS IN 1911

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
1													1				1			
				1									1				1			
	1												1				1			
1	1		1										3				3			
					1								1				1			
				1									1				1			
				1									1					1		
1	2		1	1		1							6				5	1		
1	**2**			**1**									**4**				**3**	**1**		
								1					1				1			
				1									1					1		
				1									1				1			
				1									1				1			
	1												1					1		
			1										1					1		
						1							1				1			
							1							1				1		
						1								1				1		
		1											1				1			
	1		1	1									3				3			
2	3	3											8				5	3		
2	**3**	**3**											**8**				**5**	**3**		
1													1				1			
				1									1				1			
			1										1				1			
1	1	3	1	2			1						11	1			10	1	1	
1		**1**					**1**						**2**	**1**			**2**		**1**	
				1									**1**				**1**			
	1		**1**	**1**									**3**				**2**	**1**		
					1								1					1		
						1								1			1			
		1											1				1			
1													1				1			
				1									1				1			
		1											1				1			
	1	1											2				2			
8	11	10	9	12	2	1	2	1					55	1			46	11	2	

TABLE LIII—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Becker	2	2		2			1									1		
Beltrami	2		2	2						1		1						
Big Stone	1	1		1			1											
Brown	3	2	1	3			1					1			1			
New Ulm	**1**	**1**		**1**			**1**											
Dakota	2	1	1	2					1				1					
Douglas	4	3	1	4					2				1			1		
Hennepin	8	6	2	8					1		3	1			1	1		1
Minneapolis	**8**	**6**	**2**	**8**					**1**		**3**	**1**			**1**	**1**		**1**
Lake	1		1	1					1									
Le Sueur	1		1	1												1		
Lincoln	1	1		1									1					
McLeod	1	1		1								1						
Mille Lacs	1	1		1					1									
Mower	1	1		1				1										
Nobles	2	1	1	2			1					1						
Pipestone	1	1		1											1			
Ramsey	4		4	4							2	1	1					
St. Paul	**3**		**3**	**3**							**1**	**1**	**1**					
St. Louis	4	2	2	4			1						1	1		1		
Duluth	**1**		**1**	**1**										**1**				
Hibbing	**1**	**1**		**1**									**1**					
Virginia	**1**		**1**	**1**			**1**											
Wadena	1		1	1													1	
Waseca	1	1		1													1	
Washington	1		1	1										1				
Winona	1		1	1						1								
Wright	1	1		1			1											
Total	44	25	19	44			6	1	6	2	5	6	5	2	3	5	2	1

EPIDEMIC CEREBRO-SPINAL MENINGITIS IN 1911

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W. & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
		1		1									2				1		1	
							1		1					2				2		
1													1				1			
1			2										3				3			
			1										1				1			
				2									2				2			
	1		2	1									4				4			
5				2			1						8				6	1		1
5				**2**			**1**						**8**				**6**	**1**		**1**
		1											1				1			
			1										1				1			
1													1				1			
1													1				1			
1													1				1			
1													1				1			
2													2				2			
				1									1				1			
2				1		1							3		1		3		1	
1				**1**		**1**							**2**		**1**		**2**		**1**	
		3				1							3	1			2	2		
						1								**1**				**1**		
		1												**1**			**1**			
		1											**1**				**1**			
	1												1				1			
		1											1				1			
			1										1				1			
								1						1					1	
			1										1				1			
15	2	6	7	8	....	2	2	1	1	...	....	....	39	4	1	..	35	5	3	1

TABLE LIV—DEATHS FROM

COUNTY	Total	Sex		Color			Month of Death											
		Male	Female	White	Black	Other Color	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aitkin	2		2	2						1		1						
Anoka	1		1	1														1
Becker	2		2	2										1	1			
Big Stone	1		1	1									1					
Blue Earth	2		2	2													1	1
Brown	2		2	2						1	1							
Carlton	2		2	2						1					1			
Cloquet	**2**		**2**	**2**						**1**					**1**			
Carver	1		1	1										1				
Cass	1		1	1					1									
Chippewa	2		2	2			1							1				
Chisago	1		1	1											1			
Cottonwood	2		2	2					1	1								
Crow Wing	1		1	1												1		
Brainerd	**1**		**1**	**1**												**1**		
Dakota	2		2	2						1			1					
Dodge	1		1	1							1							
Douglas	1		1	1												1		
Faribault	4		4	4				2	1									1
Fillmore	1		1	1														1
Freeborn	1		1	1					1									
Goodhue	2		2	2					1					1				
Hennepin	18		18	18			1	1	2	4	1	2	2	4	1			
Minneapolis	**17**		**17**	**17**			**1**	**1**	**2**	**4**	**1**	**2**	**2**	**3**	**1**			
Hubbard	2		2	2						1			1					
Isanti	5		5	5				1				1			1	1		1
Itasca	2		2	2					1	1								
Jackson	5		5	5				1		1	1	1					1	
Kandiyohi	2		2	2				2										
Lac qui Parle	1		1	1											1			
Lyons	2		2	2			2											
McLeod	1		1	1					1									
Mahnomen	1		1	1														1
Marshall	1		1	1				1										
Martin	2		2	2						1	1							
Mille Lacs	2		2	2							1	1						
Morrison	2		2	2						1								1
Little Falls	**1**		**1**	**1**														**1**
Nicollet	1		1	1				1										
Nobles	2		2	2									1				1	
Norman	1		1	1								1						
Otter Tail	2		2	2				1										1
Pennington	3		3	3					1	1	1							
Pine	3		3	3					1				1	1				
Pope	1		1	1								1						
Ramsey	20		20	20			4	1	1	4	3		1		1		4	1
St. Paul	**19**		**19**	**19**			**4**	**1**	**1**	**4**	**2**		**1**		**1**		**4**	**1**
Redwood	1		1	1						1								
Rice	2		2	2				1									1	
Rock	2		2	2								1					1	
St. Louis	14		14	14				1	2	3	1		1		2	2		2
Duluth	**9**		**9**	**9**						**3**	**1**		**1**		**1**	**1**		**2**
Hibbing	**3**		**3**	**3**				**1**	**1**						**1**			
Scott	3		3	3			1					1						1
Sherburne	1		1	1					1									
Sibley	2		2	2				1					1					
Stearns	1		1	1				1										
Steele	1		1	1														1
Todd	2		2	2								1					1	
Wadena	1		1	1						1								
Washington	2		2	2							1		1					
Stillwater	**1**		**1**	**1**									**1**					
Watonwan	1		1	1			1											
Wilkin	1		1	1								1						
Winona	1		1	1														1
Winona	**1**		**1**	**1**														**1**
Wright	1		1	1				1										
Yellow Medicine	1		1	1											1			
Total	148	...	148	148	...	...	10	16	15	24	12	12	12	9	9	5	10	14

PUERPERAL SEPSIS IN 1911

Age													Conjugal Cond.				Birth Place			
Und. 1	1 to 2	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Over 80	Not Given	Single	Married	W & D.	Not Given	Minn.	Other U. S.	Foreign	Not Given
					2									2			2			
							1							1			1			
						2								2			1		1	
					1									1			1			
				1			1							2			1	1		
						1	1							1		1	1		1	
						2								2					2	
						2								**2**					2	
					1									1					1	
						1								1				1		
					1	1								2			2			
					1									1			1			
					1	1								2			1	1		
						1								1			1			
						1								**1**			**1**			
				1	1									2			1	1		
					1									1			1			
					1									1				1		
					1	2	1							4			1	2	1	
					1									1			1			
					1									1			1			
					1	1								2			1		1	
					9	7	2							18	1		6	4	8	
					9	**6**	**2**							**16**	**1**		**5**	**4**	**8**	
					1	1								2				1	1	
				1	2	2							2	2			3		2	
						2								2					2	
					3	1	1						1	1				4	1	
						2								2			1		1	
					1									1			1			
						2								2					2	
							1							1			1			
							1							1			1			
				1										1			1			
					2									2				1	1	
				1	1								1	1				1	1	
					1	1								2			1		1	
					1									**1**			**1**			
						1								1			1			
					1		1							2				1	1	
						1								1				1		
						2								2			1	1		
						3								3			1	1	1	
					1	2								3					3	
					1									1			1			
				1	9	8	2						5	15			4	10	6	
				1	**9**	**7**	**2**						**5**	**14**			**3**	**10**	**6**	
					1									1			1			
					2									2			2			
					1	1								2			1	1		
				1	5	8								13	1		2	5	7	
				1	**3**	**5**								**8**	**1**		**1**	**4**	**4**	
					1	**2**								**3**			**1**	**1**	**1**	
					2	1								3			3			
						1								1					1	
						1	1							2			2			
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					1		1							2			1		1	
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					1	1								2			1	1		
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					1									**1**			**1**			
				1									1				1			
				1										1				1		
				9	63	61	15						10	136	2		57	13	48	

STATE BOARD OF HEALTH

REPORT OF

DIVISION OF EPIDEMIOLOGY

AUGUST 1, 1910, TO AUGUST 1, 1912

H. W. HILL, M.D., D.P.H., DIRECTOR

London, Ontario, Canada, February 13, 1913.

BIENNIAL REPORT OF THE DIVISION OF EPIDEMIOLOGY TO JULY 31, 1912.

LETTER OF TRANSMISSAL TO THE MINNESOTA STATE BOARD OF HEALTH FROM THE DIRECTOR OF THE DIVISION TO THE MINNESOTA STATE BOARD OF HEALTH.

Gentlemen: The biennial report of the Division of Epidemiology herewith enclosed is a report of the activities of that division for the last two years, from August 1, 1910, to July 31, 1912, representing the last two years of my connection with your Board. The immense amount of labor connected with the preparation of this report fell to my then colleague and now successor, Dr. A. J. Chesley, my only part being to read, suggest a few minor changes, and approve the same.

I wish to direct your attention especially to the following points:

(1) The very large number of epidemiological investigations (approximating an average of four per week) successfully covered during this period, notwithstanding there was available, as a rule, but one epidemiologist at a time; for although Dr. Chesley and myself were both in the Division of Epidemiology, I had been detailed to conduct public health lectures and to prepare public health literature to an extent which seriously cut down the amount of field work in epidemiology which I could do.

(2) The special investigations originated by the Epidemiological Division and conducted very largely by Dr. Chesley, particularly those relating to the disease census of school children and the losses incurred by closing schools on account of epidemics.

(3) The really most important practical advance worked out, particularly by Dr. Chesley, placing the management of scarlet fever on a par with, or even ahead of, the management of diphtheria by cultures. This matter is particularly illustrated in the account of the Thief River Falls scarlet fever epidemic, page 268.

(4) The account of the typhoid fever outbreak at Two Harbors, presenting many features of the greatest interest, illustrating in the most clean-cut manner the immediate and conclusive effect of hypochlorite in destroying the infection in the water and the excellent effect of publicity through the press and through the visiting nurse in preventing contact infection. This outbreak, although smaller than the Mankato epidemic, ranks ahead of the latter in the definiteness of its characteristics and in the excellence of the supervision given to it.

(5) The systematization of the record keeping and especially the development of the record keeping to the point where it is made of the utmost immediate value, together with the follow-up system, devised and carried out by Dr. Chesley, places the Division of Epidemiology, at the present time, on a par with, if not ahead of, any similar organization with which I am acquainted. The fact that I am no longer connected with the division enables me to point out these excellences more freely than if I were connected with it. The only recommendation which I have to offer is that the wonderfully efficient and far-reaching work of this division should be encouraged and its value increased by great expansion in the number of men employed and in the facilities for conducting the work.

The recent completion of the New Public Health Series of articles which were begun while I was director of the Division of Epidemiology and continued after I left Minnesota, terminates completely my official relationship with your Board. It is fitting, therefore, that I should express to you at this time my deep appreciation of the many kindnesses and courtesies which I have received at your hands and the great professional pleasure and satisfaction which your hearty support of the Epidemiological Division enabled those connected with it to enjoy.

All of which is respectfully submitted.

H. W. HILL,
Director to July 31, 1912.

State Board of Health

Report of

Division of Epidemiology

August 1, 1910, to August 1, 1912

H. W. HILL, M. D., D. P. H., DIRECTOR.

(Prepared by A. J. Chesley, M. D., Director Since August 1, 1912.)

INTRODUCTION.

From the time Dr. Hill was appointed Epidemiologist, August 1, 1909, to January 1, 1911, the epidemiological work was done almost entirely by Dr. Hill, aided occasionally by members of the Laboratory Division or by assistance procured from persons not members of the State Board of Health staff. Dr. A. J. Chesley, of the Laboratory Division, did field work during a part of December, 1910, and was appointed epidemiologist on full time January 1, 1911. Dr. Hill, at the meeting of the Board July 9, 1912, resigned, in order to become director of the Institute of Public Health at London, Ontario, Canada. His resignation took effect August 1, 1912.

The previous report gave an account of the work from August 1, 1909, to December 31, 1910. The **Establishment, Duties, Objects, Equipment, Subdivisions of Epidemiology,** a discussion of the purposes of the work and its relation to other branches of public health were covered. The general considerations having been thoroughly outlined in the previous report, the detailed procedures of the field and statistical epidemiological work will be given in this report. Certain investigations, etc., will be cited to illustrate the field practice of the methods outlined in the first report, and no reference will be made to work done between August 1, and December 31, 1910, except that the names of the places where investigations, etc., were made will be listed.

COMMUNICABLE DISEASE REPORTS.

The attending physician notifies the local health officer of a case by a regular reporting post card for infectious diseases. The local health officer, after carrying out the measures prescribed in the regulations for the control of the disease, mails the card to the executive officer of the State Board of Health. The executive officer reports smallpox weekly to the surgeon general of the United States Public Health and Marine Hospital Service. The cards are finally forwarded to the Division of Epidemiology.

In addition to the post cards, primary notification of cases of diphtheria, typhoid fever, tuberculosis, poliomyelitis, cerebro spinal meningitis, glanders (human) and rabies (human) have been copied from the data accompanying specimens sent to the Laboratory Division for examination. Unofficial information concerning infectious diseases not otherwise reported is obtained from newspaper clippings, etc., and followed up through correspondence with local health officers, boards of supervisors, school officials, attending physicians and families concerned. The data are copied on colored index cards. Each disease has a different colored card. The cards are filed by disease under county and the sub-divisions township, village and city.

The report card used during this biennial period (see form I, page 285) and the release of quarantine card (see form II, page 285) have been changed in order to save the time spent in copying the data on the colored cards and to obviate possible error in copying of data. The new cards (see form Ia, Ib, page 286 and form IIa, page 287) are now used as final records, being filed by disease under county, township, village, city. The local health officers now send the reports directly to the Division of Epidemiology. Certain cities use sheets instead of cards. (See forms III, page 287 and IV, page 287). The returns are tabulated on the "Age and Sex" sheets (see form V, page 288.) and on the "Source and Release" sheets (see form VI, page 289.)

Previous to June, 1912, the division made weekly reports of poliomyelitis to the surgeon general of the United States Public Health and Marine Hospital Service. Since then in accordance with the resolutions passed June 1, 1912, at the tenth annual conference of the State and Territorial Boards of Health with the Public Health and Marine Hospital Service, monthly reports covering the incidence and geographic distribution of notifiable diseases in Minnesota have been made. (See form VII, page 289 and form VIII, page 290.)

Public Health Report No. 49, Vol. XXVII, December 6, 1912, published by Surgeon General Blue of the United States Public Health Service, contains the reports for June, July, August, September and October, 1912.

SCHOOL LOSSES DURING EPIDEMICS.

The unnecessary closing of schools on account of epidemics of preventable diseases is a factor worth considering in public health work. In rural districts where only a few families are represented in a school and the children are kept at home while the school is closed, this method may be effectual and economical, but only in certain diseases. In cities, villages and consolidated rural schools the loss in time and money due to the closing of school is not justified by the results because the children associate with each other elsewhere and the detection of mild, unrecognized or concealed cases is made very difficult. When the schools are kept open and proper supervision is maintained, these cases are quickly recognized, excluded from school, their families investigated and precautions taken against the spread of the disease.

In 1911 the county superintendents of schools were asked to give on a schedule (see form IX, page 290), certain information about the closing of schools during epidemics.

Schedules were filled out by 73 of the 86 county superintendents in the state. Thirteen superintendents did not reply to repeated requests for information. The thirteen counties under their respective jurisdictions have 50,131 pupils enrolled in 140 school districts covering 273 townships.

Seventeen superintendents reported that no schools had been closed on account of epidemics. The 17 counties have 46,169 pupils enrolled in 1,153 school districts covering 344 townships.

Eleven superintendents stated that they had no data upon which to base a report. The 11 counties have 63.565 pupils enrolled in 1,149 school districts covering 229 townships.

Three superintendents appointed January 1, 1911, were unable to report for the previous months of 1910, but filled out schedules for the school months of 1911.

Minneapolis, St. Paul and Duluth are not included under their respective counties, and have not been considered here.

A summary of the schedules sent in by the superintendents of 43 counties was made to show the general factors involved.

The losses due to each disease are shown in the following table:

TABLES SHOWING LOSSES DUE TO CLOSING NINETY-NINE PUBLIC SCHOOLS DURING EPIDEMICS OF PREVENTABLE DISEASES IN SCHOOL YEAR, SEPTEMBER, 1910, TO JUNE, 1911.

SCARLET FEVER.

County.	Number of School House.	Number of Children Excluded.	Number of Teachers Excluded.	School Days Lost.	Estimated Direct Financial Loss to School District.
Becker	1	900	26	5	$350.00
Chisago	1	35	1	20	50.00
*Crow Wing	7	120	3	10	75.00
Dodge	2	40	2	40	70.00
Fillmore	7	45	1	5	20.00
	144	40	1	5	20.00
Freeborn	131	45	1	15	20.00
Goodhue	164	24	1	10	90.00
	36	61	2	10	215.00
Hennepin	54	40	1	10	24.00
	56	21	1	5	12.00
	57	46	1	10	24.00
Hubbard	1	550	12	20	600.00
Kandiyohi	58	28	1	15	32.00
	96	34	1	5	13.00
	40	32	1	10	25.00
Koochiching	1	18	1	20	48.00
Lincoln	61	42	1	15	35.00
	3	50	2	15	50.00
McLeod	68	7	1	10	24.00
Meeker	52	30	1	10	30.00
Red Lake	126	65	2	10	60.00
Redwood	1	40	1	3	10.00
Rock	66	140	4	20	240.00
	19	27	1	10	25.00
	39	24	1	10	25.00
	35	30	1	10	25.00
Roseau	41	200	6	5	100.00
	41	35	1	20	55.00
Sherburne	Ind. Dist.	300	10	7	207.00
Stevens	59	40	1	20	60.00
	49	28	1	10	25.00
Todd	133	20	1	10	50.00
	143	22	1	10	50.00
Wabasha	23	54	1	10	30.00
	89	36	2	15	15.00
	2	60	2	5	15.00
Wadena	1	400	12	10	100.00
	7	30	1	10	22.50
Wilkin	2	50	2	5	30.00
	44	30	2	10	50.00
	19	18	1	10	30.00
	6	15	1	5	12.50
Winona	17	80	2	5	25.00
	41	50	2	5	25.00
	60	310	10	5	150.00
	43	4,235	131	525	$2,593.00

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*Data for 1911 only.

DIPHTHERIA.

County.	Number of School House.	Number of Children Excluded.	Number of Teachers Excluded.	School Days Lost.	Estimated Direct Financial Loss to School District.
Carlton	15	145	3	30	$330.00
Carver	2	40	1	10	25.00
	14	28	1	10	25.00
	40	30	1	15	40.00
	31	50	1	5	15.00
Clearwater	1	56	2	10	50.00
Cottonwood	45	30	1	5	15.00
Goodhue	165	41	1	10	55.00
Le Sueur	88	53	2	10	50.00
	107	58	1	60	150.00
	57	38	1	5	12.00
Meeker	9	500	20	5	400.00
	90	25	1	5	20.00
Otter Tail	154	14	1	10	25.00
	109	43	1	5	30.00
*Pennington	34	21	1	30	72.00
Red Lake...........	228	21	1	40	95.00
Redwood	108	60	2	10	48.00
Renville	32	37	1	10	50.00
	39	28	1	10	50.00
	23	29	1	10	40.00
Roseau	19	30	1	10	24.00
St. Louis...........	10	35	1	10	32.50
Sherburne	31	50	1	6	17.00
	33	40	1	5	10.00
	47	15	1	10	25.50
Stevens	40	40	1	30	60.00
Wabasha	23	54	1	10	30.00
	89	36	2	15	45.00
	2	60	2	5	15.00
Yellow Medicine....	18	26	1	30	75.00
	31	1,766	57	428	$1,998.00

SMALLPOX.

County.	Number of School House.	Number of Children Excluded.	Number of Teachers Excluded.	School Days Lost.	Estimated Direct Financial Loss to School District.
*Becker	45	24	1	20	$48.00
Big Stone...........	1	400	14	5	240.00
	9	20	1	20	50.00
	12	30	1	10	55.00
Douglas	51	45	1	20	48.00
	64	40	1	15	36.00
Fillmore	79	12	1	40	70.00
Ramsey	1	88	2	5	60.00
Rock	53	24	1	10	20.00
Stevens	39	30	1	10	30.00
	33	48	1	10	30.00
	11	761	25	165	$687.00

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*Data for 1911 only.

MEASLES.

County.	Number of School House.	Number of Children Excluded.	Number of Teachers Excluded.	School Days Lost.	Estimated Direct Financial Loss to School District.
Aitkin	83	20	1	15	$36.00
Benton	1	35	1	20	50.00
*Lac qui Parle.....	22	20	1	5	15.00
	24	14	1	3	7.00
Lincoln	50	27	1	15	20.00
Meeker	22	30	1	5	40.00
Nicollet	21	35	1	10	20.00
Scott	10	90	2	5	125.00
	32	40	1	10	90.00
Yellow Medicine....	52	29	1	10	20.00
	10	340	11	98	$423.00

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*Data for 1911 only.

TYPHOID.

County.	Number of School House.	Number of Children Excluded.	Number of Teachers Excluded.	School Days Lost.	Estimated Direct Financial Loss to School District.
Red Lake...........	1	30	1	15	$50.00

FACTORS INVOLVED IN EPIDEMICS DURING SCHOOL YEAR, 1910-1911.

Diseases.	Counties.	Districts.	Excluded		Days.	Estimated Direct Loss in Wages.
			Pupils.	Teachers.		
Scarlet fever	25	46	4,345	131	305	$2,593.00
Diphtheria	18	31	1,766	57	428	1,998.00
Smallpox	7	11	761	25	165	687.00
Measles	8	10	340	11	98	423.00
Typhoid	1	1	30	1	15	50.00
Not specified	4	5	151	5	36	73.50

In certain instances teachers gave their services and made up time lost while schools were closed, therefore the actual loss in teachers' wages is somewhat less than the estimated total loss, $5,824.50.

Quotations from county superintendents' notes and from newspaper clippings indicate that the list does not cover the losses even in some counties from which reports were made.

County.	County Superintendent's Statement.
Fillmore	"Other schools closed * * do not recall."
Hennepin	"One school closed short time, scarlet fever. No data at hand."
Houston	"No records. No. 7, Money Creek, closed for scarlet fever, 1910."
McLeod	"Measles cut up Stewart schools badly."
Otter Tail	"Not accurate, no note was taken; report what was remembered."
Pennington	"Cannot give full data."
Pipestone	"One school closed on account of infantile paralysis."
Polk	"Two or three districts; five about three weeks each; measles, mumps, scarlet fever; loss averaged about $20.00 per district."
St. Louis	"District No. 1, thirty-five pupils, one teacher; write C. F. Zacher, Iron, Minn."
Wilkin	"Report not accurate; not notified always."
Winona	"Other district closed; not reported to me."

NEWSPAPER CLIPPINGS.

County.		
Traverse	Wheaton village	Wheaton "Footprints," April 10, 1911: "Miss ——— has temporarily closed her school in the L. A. Anderson district on account of diphtheria."
Blue Earth	Good Thunder village	Minnesota Lake Tribune, February 16, 1911: "Schools closed on account of scarlet fever."
Mahnomen	White Earth Reservation	White Earth Tomahawk, February 16, 1911: "Fearing the introduction of scarlet fever, which is theartening in Detroit, Major Howard had the government boarding school quarantined."
Houston	Money Creek	Houston Signal, February 16, 1911: "Village school closed on account of several new cases of scarlet fever."
Marshall	Newfolden	Newfolden Review, April 15, 1911: "School closed Friday last week to fumigate school house and prevent spread of scarlet fever."
Mower	Varco	Austin Transcript, April, 1911: "No school this week. Probably not again this term."
Otter Tail	Perham	Perham Bulletin, April 8, 1911: "St. Annis Catholic school closed for a week or more and no services in most of the churches Sunday."
Rice	Erin	Faribault Democrat, April, 1911: "Schools Nos. 119, 70, 123 closed on account of scarlet fever spread."
Wright	Cokato	Dassel Author, February 9, 1911: "Schools closed and general quarantine throughout village on account of scarlet fever epidemic."
Yellow Medicine	Clarkfield	Belview Independent, March 24, 1911: "Clarkfield school closed on account of scarlet fever."
Otter Tail	Inman	Fergus Falls Weekly, June 1, 1911: "School in district 93 has been closed for a few weeks on account of smallpox."

These facts indicate, and the superintendents themselves state, that **the closing of schools on account of infectious diseases is not reported as it should be.** Our request for reports has been repeated in public addresses throughout the state to teachers, superintendents, school boards and health officers. The returns for the school year 1910-1911, show that regular reports should be required. The district officers should report to the county superintendent, the county superintendent to the state superintendent January 1st and at the end of the school year. Reports should be made to the local health officer immediately upon the appearance of a suspicious case in a school. State Board of Health regulations define the duties of school and health officers in the protection of the health of school children.

From September, 1911, to June 1912, information from various sources about schools closed was obtained which confirms the above statements.

Regular schedules were sent in by the superintendents of Grant, Jackson, Otter Tail, Rice, Rock, Stevens and Watonwan counties, where schools were closed on account of epidemics of diphtheria, scarlet fever and smallpox.

In the seven counties the estimated total loss of the fifteen districts affected was $515. In two other districts, schools were closed, but there was no actual loss because the time was made up later.

Newspapers clippings **gave first notice** of school closed on account of:

Smallpox in Grant, Olmsted, Rock, Swift and Watonwan counties.

Diphtheria in Cottonwood, Dakota, Freeborn, Otter Tail, Grant, Rock and Stevens counties.

Scarlet fever in Blue Earth, Goodhue, Koochiching, Meeker, Mower, Nobles, Pine, Rock, Steele, Wabasha and Watonwan counties.

Upon receipt of such notice, letters of inquiry were sent to the county superintendents, the local health officer and in some cases to teachers and physicians asking for information. Several of the newspaper statements were not based upon facts. Others enabled the state board to get in touch with matters of serious concern. The value of the follow-up system is shown by this since no report had been made by local health authorities or physicians previous to the receipt of the newspaper information. This method will be continued and local officials will be checked up on reports.

A DISEASE CENSUS OF MINNESOTA SCHOOL CHILDREN.

Health department figures upon **deaths** due to infectious diseases are fairly reliable, but figures showing the number of **cases** of infectious diseases are absolutely untrustworthy. If every case of infectious disease seen by a physician was reported the records would not even be approximately correct since it is not customary to call a doctor to treat the mild cases of the common diseases of childhood.

When medical supervision is carried out in all the schools of a city, few cases of infectious disease escape detection because suspicious cases are followed up by the visiting nurses or the health department physicians and kept under observation until safe. Such supervision always brings about a marked drop in the deaths from infectious diseases, a much better attendance at school and after a little time cases of infectious diseases among school children become relatively rare.

Medical supervision in village and rural schools is impossible under present conditions, but can we afford to neglect these schools when we consider how great is the yearly loss in this state when schools are visited by epidemics? It should be remembered that while only about 45 per cent of the school tax comes from the country districts and only about one-third of the total amount spent on public schools in the state is spent for rural schools almost two-thirds of all the school children in Minnesota attend these schools. Furthermore, Minnesota collects about $4.50 per capita for educational expenses and spends about three cents per capita for public health expenses. Although lacking men and money for school health supervision, a beginning may be made through a disease census of the school children.

The only reliable complete data covering the common infectious diseases of childhood have been collected in large cities where the environment and activities of child life are very different from those of Minnesota children. Deductions from such data are not of much practical value here. We should get our information about the child from his mother who knows what diseases he has had including those which no physician attended.

RUSHFORD THE FIRST TO MAKE A CENSUS.

An opportunity for beginning this work presented itself at Rushford, Minnesota, in January, 1911. The local board of health asked for assistance in the control of an epidemic of scarlet fever. Dr. Chesley was sent to investigate the situation. The school board, upon his recommendation, appointed a visiting nurse to assist the health officer in his work.

The superintendent of schools offered to direct the nurse in making a disease census as part of her work of supervision of all children in families represented in the Rushford schools.

The data collected by Superintendent Sanford and Nurse Lekivetz are remarkably complete. They deserve great credit for undertaking the pioneer work of a general disease census of Minnesota school children.

Following the work at Rushford the disease census cards (see form X, page 291) were distributed to certain schools where the school officers took special interest in public health measures. After the cards had been filled out by the mothers under the direction of the teachers they were sent to the Division of Epidemiology. Here the data were tabulated on the summary sheets. (See form XI, page 292-3.) A summary was prepared for each school. The totals of all the school summaries were tabulated and the results are shown graphically in the charts. This work was an experiment, being the first of its kind. Every detail has been studied and the summary sheet seems to provide for the desired information.

The disease census will be extended throughout the state. The cards will be kept in the schools and only the summary sheets prepared by the teachers will be sent to the Division of Epidemiology for statistical study. After the mothers have given their information concerning the past history of their children, the teachers will keep the cards up to date. When a pupil has one of the listed diseases his teacher will make the proper entry on his card upon his return to school. Inquiry will be made about sickness during the vacation when school opens. If the pupil moves or is promoted, his card will be transferred to the school he is about to attend.

Locally, the cards will be used when an epidemic appears in a district. If the disease is one which confers, as a rule, life-long immunity through one attack, reference to the card index immediately shows which pupils are so protected.

The cards will assist in differential diagnosis early in the disease and much time will be saved in getting a true perspective of the situation and in outlining the best method of handling the epidemic.

Information obtained by teachers from parents when there is no epidemic is far more reliable than that hastily gathered during the excitement and confusion of an epidemic. The statistical outline given in the charts and notes indicates some of the other ways in which the data will be generally serviceable.

The data of 5,500 disease census cards, representing 2,700 male and 2,800 female school children, have been charted according to scale in sex and age groups. The first chart shows that females having different diseases outnumbered the males in about the same ratio as the totals. Ninety per cent of the 5,500 children had one or more of the listed diseases. The data are only approximately accurate, since forgotten sicknesses and mistaken diagnoses are unavoidable in such census taking.

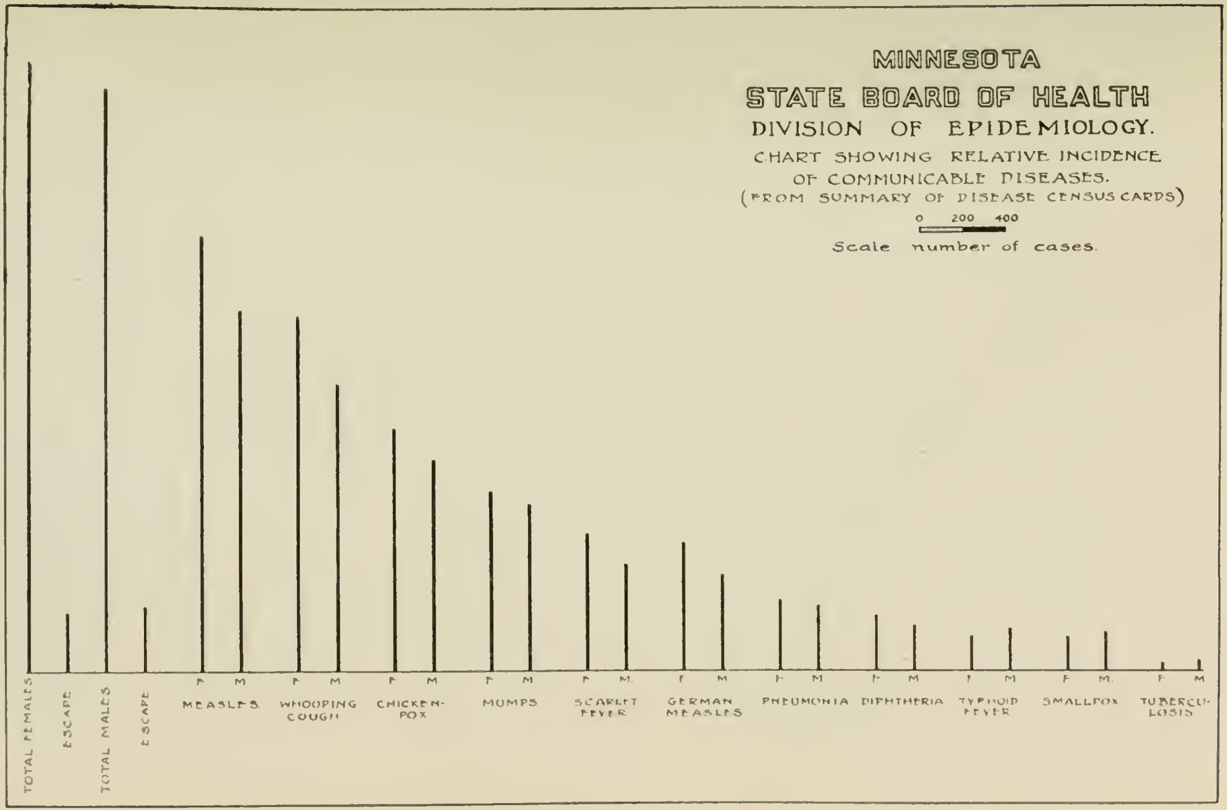
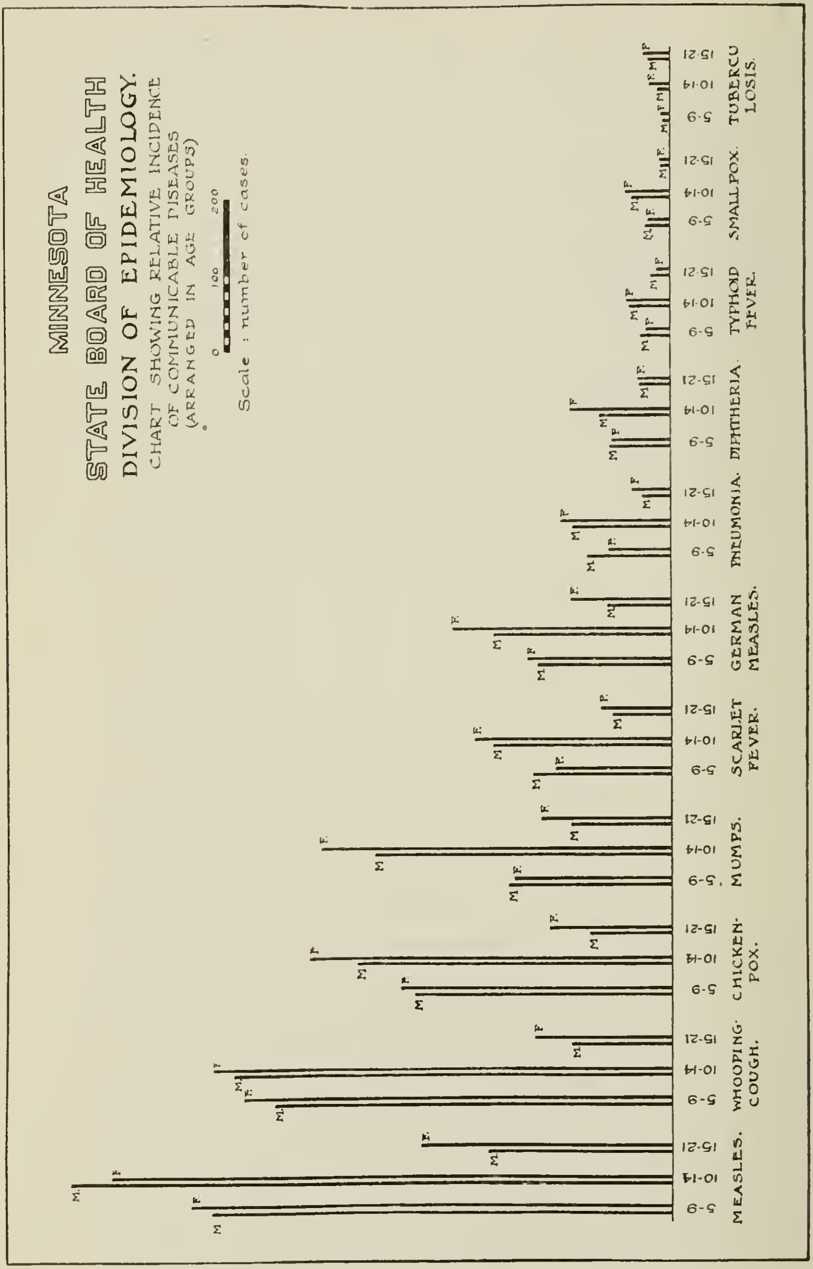

MINNESOTA
STATE BOARD OF HEALTH
DIVISION OF EPIDEMIOLOGY.
CHART SHOWING RELATIVE INCIDENCE
OF COMMUNICABLE DISEASES.
(FROM SUMMARY OF DISEASE CENSUS CARDS)
0 200 400
Scale number of cases.
TOTAL FEMALES
ESCAPE
TOTAL MALES
ESCAPE
F M
MEASLES.
F M
WHOOPING COUGH
F M
CHICKEN-POX
F M
MUMPS
F M.
SCARLET FEVER
F M
GERMAN MEASLES
F M
PNEUMONIA
F M
DIPHTHERIA
F M
TYPHOID FEVER
F M.
SMALLPOX
F M
TUBERCULOSIS

Chart No 1


MINNESOTA
STATE BOARD OF HEALTH
DIVISION OF EPIDEMIOLOGY.
CHART SHOWING RELATIVE INCIDENCE OF COMMUNICABLE DISEASES (ARRANGED IN AGE GROUPS)
0
100
200
Scale : number of cases.
MEASLES.
WHOOPING-COUGH.
CHICKEN-POX.
MUMPS.
SCARLET FEVER.
GERMAN MEASLES.
PNEUMONIA.
DIPHTHERIA.
TYPHOID FEVER.
SMALLPOX.
TUBERCULOSIS.
5-9
10-14
15-21
M
F

The first chart compares the total number of children of each sex with those who are said to have escaped all of the diseases. It also shows the proportion of males and females who had each disease. This chart points out that the results of exposure to these diseases are not influenced by the sex of the exposed, but only by the total number.

The second chart shows by age groups, 5 to 9, 10 to 14, 15 to 21 years, the prevalence of each disease. The total number of males and females in the three age groups are roughly proportionate to the relative incidence of the disease except tuberculosis, i. e., the 15 to 21 group is smallest, the 5 to 9 group next, and the 10 to 14 group largest.

MEASLES.

Thirty-eight hundred had measles. The total number of deaths from measles in Minnesota in 1910 was 263; in 1911, 112. Measles is one of the most dangerous diseases of childhood, because frequently children never regain their former strength, the eyes, ears or lungs being affected. The causative agent is transmitted by the nose and throat discharges of the sick to the well. It is now generally conceded that desquamation from measles has nothing to do with infection. No disinfection is required after measles. Second attacks are not very uncommon, but immunity after one attack is the rule.

WHOOPING COUGH.

Twenty-eight hundred had whooping cough. In the age group classification the disease had occurred in about 100 more children in 10 to 14 than in group 5 to 9; while there was a marked diminution in the group 15 to 21. Deaths from whooping cough in Minnesota in 1910 numbered 172; in 1911, 180. Whooping cough is a very common disease. Its frequent complications and sequelae are persistent vomiting, resulting in anemia, pneumonia, etc. Like measles, the germ is given off in the nose and throat discharge. Epidemics in children's homes usually have a high mortality and always are very difficult to control.

CHICKENPOX.

Twenty-two hundred had chickenpox, but in all probability many of these cases were really mild, unrecognized smallpox. Death rarely results from chickenpox. The causative agent is not known. One attack usually confers immunity for life, but chickenpox never protects against smallpox, nor does smallpox protect against chickenpox. The disease is considered here because of the difficulty in differential diagnosis between it and mild smallpox.

MUMPS.

Sixteen hundred had mumps. The number of cases in the age group 10 to 14 was double that in age group 5 to 9. The germ of the disease is not known. Complications are rather rare, being orchitis, ovaritis, cerebral infection, albuminuria, pleurisy and hemiplegia. Our scant figures indicate that males and females are affected almost equally, but Osler states that males are more frequently affected than females.

SCARLET FEVER.

Eleven hundred and fifty had scarlet fever. The specific germ of scarlet fever is not known. According to some authorities about 90 per cent of all cases occur under the tenth year. According to the age group classification 230 children had scarlet fever during the ages of 5 to 9, while 660 had the disease from 10 to 21. Age has been considered a predisposing factor. However, exposure to infection is the essential factor. A mild case is even more dangerous to a community than a severe one. The common complications and sequelae are nephritis, otitis media and adenitis. The total number of deaths in Minnesota from scarlet fever in 1910 was 284; in 1911, 190. The infectious material is present in the discharges from the nose, throat and ear, (in case of ear complications with discharge.)

During desquamation the nose and throat discharges may be transferred to and carried by the fine scales, especially of the hands. The skin may be lubricated with vaseline to prevent this.

GERMAN MEASLES.

One thousand had German measles. This indicates that the disease is more frequent than is generally supposed. However, here again there is danger that the disease may have been incorrectly diagnosed and incorrectly reported by the child's mother. The dangers from complications are slight. The disease is often mistaken for measles or scarlet fever. A much more dangerous error creeps in when scarlet fever is diagnosed as German measles and then very shortly an epidemic of unquestioned scarlet fever occurs in the community.

PNEUMONIA.

Six hundred had pneumonia. Unfortunately, the term pneumonia is used very loosely by the laity. A child may be suffering from bronchitis, or may have only a slight cough, and some time after the child is well this attack is referred to as pneumonia. The disease is very common in children and usually occurs as a complication to some other infectious disease. The general death rate is estimated at 12 per cent in Minnesota. The true death rate is unknown.

SMALLPOX.

Two hundred had smallpox. This number is lower than it should be since many of the cases of chickenpox were probably mild smallpox. The data on vaccination obtained by the disease census cards showed that 2,400 of the 5,500 children had been vaccinated.

DIPHTHERIA.

Four hundred and seventy had diphtheria. The cause of this disease is a specific germ known as the Klebs-Loffler bacillus. The germs are given off in the nose and throat discharges of diphtheria patients, and infected "carriers" who may show no clinical symptoms. The laboratory examination of nose and throat cultures affords a reliable basis for the control of the disease. In 1910 there were 566 deaths from diphtheria in Minnesota; and in 1911, 335 deaths.

CONCLUSION.

The disease census adds to our information relating to the occurrence of infections diseases in children above the age of five. In this study it was not possible to obtain the information of the disease occurrence in the years 1 to 5. It is just these years, however, (1 to 5) that many of the diseases occur, and during which the mortality is high, as will be seen by consulting the mortality tables given elsewhere in this report. In dealing with communicable diseases the exposure to infection is the determining factor. Natural immunity occurs in some cases, and a peculiar susceptibility in others.

In such diseases as scarlet fever, chickenpox and smallpox, where one attack usually immunizes the individual, it is important that the disease be recorded. These data are valuable not only from a statistical standpoint, but for use in epidemiological work. It is useful not only to the community, but it is often very essential to the welfare of the individual himself to know whether he has had certain infectious diseases. If a child suffers from mild scarlet fever or mild smallpox, it should be recorded so that he may know about it when he is older. The disease census card will be a permanent record for the individual. When the data of the cards are tabulated and charted and the public begins to appreciate its actual loss shown in dollars and cents, as well as the damage to the individual in the way of sequelae from certain diseases such as measles, whooping cough, scarlet fever and diphtheria, the seemingly arbitrary measures instituted by boards of health for the control of the disease will be understood and supported.

From a total of 36 schools only 5,500* children have been considered, and as was stated before, only 10 per cent of these had escaped the common infectious diseases of childhood. It is seen that the expense involved in the care of the cases, the anxiety of the relatives, and the somtimes permanent injury to the individual from complications and sequelae, make it necessary that the infectious diseases of childhood should be controlled. The health supervision of school children has been neglected and the child who does not develop measles, whooping cough and chickenpox is considered a sort of abnormality. The prompt recognition and isolation of infectious cases will prevent epidemics, now too common. Medical supervision in the schools will do much in this way, and it will point out also the correct treatment and care of those who have been more or less incapacitated by the infectious diseases and their sequelae.

SCHOOL POPULATION INDEX.

During this biennial period, a card index showing the distribution of the age groups, 5 to 8 years, 8 to 18 years, 18 to 21 years, of the pupils in each school has been prepared and indexed under counties and townships (see form XII, page 294.) The location of the school building itself determines which township health organization has jurisdiction over that school. While school district boundaries may include parts of two or more townships, the location of the school building determines which township board has jurisdiction. The data for this school population index were obtained from various sources. Each county superintendent entered the number of each district for the school houses located in the township designated on the card. (At the office of the state superintendent of public instruction the figures giving the school population according to the age groups were copied from the annual reports of the county superintendents.)

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*"This census plan has been instituted recently in London, Ontario, Canada, and returns from about ten thousand children have been received to date."

This index is very useful in outlining the probabilities of an epidemic and how the means at hand should be applied in its management. The United States census records show the distribution of the population as a whole. The school population is in certain age groups only. The United States census reports show what percentage of the general population each age group represents. Knowing the topography of the locality and the social and occupational environments of the community affected, the epidemiologist forms a working plan for a given epidemic before he leaves the central office. The first notification of the epidemic may be from a newspaper clipping only; in fact, the newspaper clipping may state merely that a certain school was closed on account of the presence of a disease. With such inadequate information alone, it is possible, by consulting the maps, the card index of school population, the disease census summary, the morbidity reports and the files covering the territory involved, to outline the situation and to investigate intelligently according to the factors concerned.

PUBLICITY, LEGISLATIVE AND GENERAL EDUCATIONAL WORK.

The State Board of Health detailed Dr. Hill as its representative before the legislature during the session of 1911. Assistance was given to the various committees and members of the legislature in everything relating to public health, the preparation of bills, the explanation of the practical application of health measures and regulations, the definition of public health work in general and of its sub-divisions in detail, the economic and sociologic sides of the work, its relation to other forms of governmental activities, etc., etc.

One of the chief measures advocated before the legislature was that of district supervision by men specially trained in public health work, giving their full time to health supervision. Two plans were put forward tentatively as outlined below:

PLANS FOR RURAL STATE PUBLIC HEALTH WORK IN MINNESOTA.

The following questions are submitted to you in order to ascertain your views. If you object to the **general scheme**, reply only to the first question and state your reasons on the back of this sheet. If you endorse the **general scheme** but object to both of the plans (**Plan No. 1 and Plan No. 2**) proposed for securing it, suggest on the back of the sheet what plan you would advise.

Tabulation and publication of the returns, with names of those replying, is contemplated.

General Scheme—We believe that the solution of the state-wide rural public health situation in Minnesota lies in the provision of a number of wholetime officers who shall be both health officers and medical supervisors of schools, each to have a certain district including one or more counties, or a part of parts thereof, the ideal district being one containing a population of 20,000 to 30,000 persons.

Such officer should be a graduate in medicine with special training in public health work; should be examined and approved by the State Board of Health before being appointed; should be responsible to the State Board of Health and should be removed only on charges and only after a hearing, in his district, before the State Board of Health. He should not practice medicine during his term of service.

His duties in his own district would be to receive reports of infectious diseases; to supervise quarantine, isolation, etc.; to supervise regulations regarding the exclusion of infectious persons from school; and to supervise the sale of milk, food, etc., from or by infected families or persons; to trace mild, unrecognized or concealed cases; to investigate alleged sources of infection, and in general to take all necessary measures to detect and prevent spread of infectious diseases. He should confer with and advise local boards of health and health officers concerning sanitary problems, but would not supersede them although his advice should be mandatory concerning infectious diseases. The distribution of antitoxin, the medical supervision of schools and similar measures would be under his direction, subject to the regulations of the State Board of Health. He would have nothing to do with the treatment of cases although he would call attention to the need of such treatment by a practicing physician, when mild, unrecognized or concealed cases are discovered by him.

Prompt reporting of infectious diseases would be the only part required of practicing physicians in the control of infectious diseases. The local board of health would refer reports of such cases to the supervisor and would placard the house pending his arrival. In brief, the supervisor would investigate, direct and control all matters arising from the existence of infectious diseases in his district and be the responsible head of medical supervision in schools in addition.

Question No. 1.—Do you approve this **General Scheme?**...............

(If you object please state your reasons and suggest what plan you would advise, on the back of this sheet.)

For the appointment and compensation of the officer two plans are proposed.

Plan No. 1. A qualified candidate, nominated by the State Board of Health must be approved of by the county commissioners and the school boards of a district before appointment as wholetime health officer and medical supervisor of schools in such district, but his compensation should be derived wholly from state funds.

Question No. 2.—Do you approve Plan No. 1?........................

Plan No. 2. A qualified candidate, nominated by the county commissioners and the school boards of a district must be approved of by the State Board of Health before appointment as wholetime health officer and medical supervisor of schools in such district, but his compensation should be derived partly from county funds and partly from state aid hereafter to be provided.

Question No. 3.—Do you approve Plan No. 2?........................

If you do not approve either of these plans please outline one that you would approve on the back of this sheet.)

Signed..............................

....

Business or profession.

Have you been a health officer?...

If so, how long?..

....

Address.

Official position, if any...

Please sign and return to Minnesota State Board of Health, Capitol Building, St. Paul.

At meetings of medical societies and other bodies interested in public health, these sheets have been distributed and 102 replies have been sent in, often accompanoed by letters or notes giving suggestions for the future, or relating experiences under the present organization.

Fifty-five approved plan No. 1; thirty-five approved plan No. 2; twelve approved both plans. Of these, 68 were, or had been, health officers; 20 were physicians who had never served as health officers; 6 were licensed embalmers; one dentist, one editor, one banker, one lumberman, one druggist and two of unstated occupation, completed the list.

Thus it will be seen that all the replies received were favorable to the general plan, although there was some minor division of sentiment on the exact method of carrying the plan out. Ontario, Canada, has this plan somewhat in operation already, but on a small scale, there being seven districts with whole-time men at the head of each.

A list of Dr. Hill's lectures and publications is given since they represent an important educational work. His articles have attracted much public attention and there has been such a demand for reprints of certain ones that our supply has been exhausted. We regret that motives of economy forbid the reprinting in this report, of Dr. Hill's articles.

It is a remarkable coincidence that two papers, "The Relative Values of Different Public Health Procedures" by Dr. Hill, and "Profitable and Fruitless Lines of Endeavor in Public Health Work," by Dr. Edwin O. Jordan, should be written at the same time, neither author being aware of the other's views or intentions. (See "Engineering News," October 12, 1911.)

Reprint of an editorial for the Journal of the American Public Health Association entitled "Public Health and Public Hysteria" have been widely circulated. The author, Mr. Samuel Hopkins Adams, fascinates the reader by the clever, newsy style and keen appreciation of human nature shown in this editorial.

Dr. Hill's "New Public Health," published serially in the Northwestern Journal-Lancet, and also in book form, was syndicated and reprinted in newspapers throughout the state.

PUBLICATIONS BY DR. H. W. HILL.

Title.	Where Published.	Date.
The Epidemiology of Anterior Poliomyelitis	The Journal of the Minnesota State Medical Association and the Northwestern Lancet, Minneapolis	Sept. 1. 1909
The Contagiousness of Poliomyelitis	The Journal of the Minnesota State Medical Association and the Northwestern Lancet, Minneapolis	Mar. 15, 1910
The Uses of Morbidity Reports	The Journal of the Minnesota State Medical Association and the Northwestern Lancet, Minneapolis	Aug. 15, 1910
A Plan for the Establishment of Local Routine Epidemiological Work in Minnesota	The Journal of the Minnesota State Medical Association and the Northwestern Lancet, Minneapolis	April 15, 1911
German Measles, Measles Proper and Scarlet Fever	The Journal of the Minnesota State Medical Association and the Northwestern Lancet, Minneapolis	July 15, 1911
Smallpox and Chickenpox	The Journal of the Minnesota State Medical Association and the Northwestern Lancet, Minneapolis	Jan. 1, 1912
The New Public Health	A series of eleven papers published in the Northwestern Journal Lancet, issued on the 15th of the following months: 1912—January, February, March, April, May, June, October, November, December. 1913—January and February.	

Title.	Where Published.	Date.
Report of Committee on Typhoid	The Journal of the American Public Health Association, New York	Feb., 1910
A "Score System" for Determining the Real Relative Importance of Different Infectious Diseases	The Journal of the American Public Health Association, New York	Jan., 1911
Epidemiology of Diphtheria, Scarlet Fever and Measles	The Journal of the American Public Health Association, New York	Mar., 1911
The Relation of Universities to Public Health Work	The Journal of the American Public Health Association, New York	Aug., 1911
Epidemiology and Preventive Therapeutics	The Journal of the American Public Health Association, New York	Oct., 1911
What is Public Health Work?	Minnesota Alumni Weekly, Minneapolis	Jan. 9, 1911
Sources and Routes of Infection	Minnesota Alumni Weekly, Minneapolis	Feb. 6, 1911
Quantitative Dimensions of the Communicable Disease Problem in Minnesota	Minnesota Alumni Weekly, Minneapolis	Feb. 13, 1911
Should Sources or Routes of Infection be Chiefly Attacked?	Minnesota Alumni Weekly, Minneapolis	April 3, 1911
What are True Public Health Measures?	Minnesota Alumni Weekly, Minneapolis	May 8, 1911
Epidemiological Study of Anterior Poliomyelitis in Minnesota	Journal of the American Medical Association, Chicago	June, 1910
Report of Committee on Methods for the Control of Epidemic Poliomyelitis	Journal of the American Medical Association, Chicago	Oct. 14, 1911
Typhoid Pollution of Wells	Illinois Water Supply Association, Urbana, Ill.	Feb., 1911
Detailed Procedures to be Followed in an Epidemiological Determination of the Origin of a Typhoid Outbreak	Illinois Water Supply Association, Urbana, Ill.	Mar., 1912
Bacteriology as a Non-Technical Course for Public Schools	Science, Garrison-on-Hudson, N. Y.	Nov. 5, 1909
Non-Relation of Natural Ice to Typhoid Fever	Natural Ice Association of America, New York	Nov., 1910
Teaching Bacteriology to Mothers	Journal of Home Economics, Baltimore	Dec., 1910
The Relative Values of Different Public Health Procedures	The Engineering News, New York	Oct. 12, 1911
The Mankato Typhoid Epidemic	Journal of Infectious Diseases, Chicago	Nov., 1911
Factors in the Spread of Acute Intestinal Infections	Canadian Public Health Journal, Toronto	April, 1912

LIST OF DR. H. W. HILL'S LECTURES ON PUBLIC HEALTH.

County.	Place.	Lecture.	Date.
Aitkin	Aitkin village	Typhoid	Dec. 15, 1911
Anoka	Anoka	Tuberculosis	Nov. 3, 1910
Becker	Detroit	County superintendents of schools	Jan. 25, 1912
	White Earth	Indian school	May 11, 1912
Beltrami	Bemidji	T. B. exhibit	Oct. 4, 1910
	Bemidji	Northern Central Minnesota Teachers' Association	Feb. 8, 1912
	Bemidji	University extension	June 17, 1912
Carver:	Watertown	Teachers' meeting	Feb. 17, 1912
	Norwood	County superintendents of schools	Mar. 23, 1912
Clay	Moorhead	County superintendents of schools	Jan. 31, 1912
Cottonwood	Windom	University extension	June 6, 1912
Crow Wing	Brainerd	University extension	June 19, 1912
Dakota	South St. Paul	Teachers and school officers	Feb. 23, 191

County.	Place.	Lecture.	Date.
Douglas	Alexandria	T. B. exhibit	Sept. 19, 1910
	Osakis	Teachers and school officers	Feb. 24, 1912
Fillmore	Spring Valley	School board	Jan. 3, 1912
Freeborn	Albert Lea	County superintendents of schools	Mar. 26, 1912
Goodhue	Kenyon	T. B. exhibit	Mar. 24, 1912
	Cannon Falls	T. B. exhibit	Feb. 6, 1912
	Red Wing	University extension	June 10, 1912
Hennepin	Minneapolis	Sanitary conference	Oct. 5, 1910
	Minneapolis	Y. M. C. A.	Jan. 14, 1912
	Minneapolis	Y. M. C. A.	Mar. 17, 1912
Hubbard	Park Rapids	T. B. exhibit	Oct. 8, 1910
Itasca	Grand Rapids	Mothers' Club	April 25, 1912
Jackson	Jackson	University extension	June 3, 1912
Koochiching	International Falls	County superintendents of schools	Sept. 7, 1911
Le Sueur	Le Sueur Center	County superintendents of schools	Mar. 2, 1912
Lincoln	Lake Benton village	Tuberculosis	Sept. 25, 1911
Lyon	Marshall	T. B. exhibit	May 1, 1911
	Tracy	T. B. exhibit	May 12, 1911
Mahnomen	Mahnomen	School officers	Jan. 27, 1912
Marshall	Warren	County superintendents of schools	Feb. 22, 1912
Martin	Fairmont	University extension	June 4, 1912
Meeker	Litchfield	School officers	May 4, 1912
Murray	Lake Wilson	Public health	April 28, 1911
Nobles	Worthington	Southwestern Minnesota Medical Association	Jan. 11, 1912
	Worthington	University extension	June 8, 1912
Olmsted	Rochester	County Medical Society	Aug. 3, 1911
	Rochester	School officers	Mar. 14, 1912
Pennington	Thief River Falls	County superintendents of schools	June 22, 1912
	Thief River Falls	T. B. exhibit	Sept. 28, 1910
Polk	Crookston	T. B. exhibit	Sept. 23, 1910
	McIntosh	County superintendents of schools	Jan. 26, 1912
	Crookston	University extension	June 28, 1912
Ramsey	St. Paul	Sanitary conference	Oct. 6, 1911
	St. Paul	Y. W. C. A.	Jan. 19, 1912
	St. Paul	State Undertakers' Association	Jan. 31, 1912
	Department of Agriculture, University of Minnesota	Minnesota teachers	June 26, 1912
	Department of Agriculture, University of Minnesota	Summer school	July 19, 1912
Red Lake	Red Lake Falls	County superintendents of schools	June 21, 1912
Renville	Hector	Consolidated schools	Jan. 15, 1912
Rice	Northfield	Tuberculosis	Feb. 4, 1912
Rock	Luverne	County superintendents of schools	April 5, 1912
	Luverne	University extension	June 7, 1912
Sherburne	Elk River	Tuberculosis	Oct. 31, 1910
Sibley	Henderson	T. B. exhibit	April 22, 1912
Stearns	St. Cloud	T. B. exhibit	Sept. 16, 1910
Steele	Owatonna	University extension	June 12, 1912
Stevens	Morris	West Central Minnesota School of Agriculture	Feb. 20, 1912
	Morris	West Central Minnesota Medical Association	Feb. 20, 1912
Swift	Benson	Crow Wing Medical Society	Aug. 2, 1911
Traverse	Browns Valley	County superintendents of schools	Feb. 27, 1912
	Wheaton	Farmers' short course	Feb. 16, 1912
	Wheaton	School officers and teachers	Feb. 16, 1912
Wadena	Wadena	T. B. Exhibit	Oct. 9, 1910
Watonwan	St. James	University extension	June 5, 1912
Winona	Winona	Typhoid fever	Dec. 5, 1910
	Winona	Southeastern Minnesota Editorial Association	Mar. 8, 1911
Waseca	Waseca	University extension	June 11, 1912
Yello' Medicine	Canby	T. B. exhibit	May 5, 1911
	Granite Falls	County superintendents of schools	June 29, 1911

FIELD INVESTIGATIONS.

During the biennial period one hundred and ninety-seven epidemiological field investigations were made in sixty-four different counties. Three hundred and seventy-six days were spent in epidemiological field work alone. The territory, the subjects and the dates covered in each trip are tabulated below. One may determine by reference to this tabulation the nature of the work done in a given county. Five other lists accompanied by maps show investigations grouped under the subject headings: (1). **Typhoid Fever, Dysentery, Diarrhea**; (2) **Diphtheria**; (3) **Scarlet Fever, German Measles, Measles**; (4) **Smallpox, Chickenpox**; (5) **Trachoma, Tuberculosis, Poliomyelitis, Leprosy, Miscellaneous.** The work previous to January 1, 1911, is tabulated only.

Because of insufficient funds for printing, only a few complete reports and specimen summaries can be included in this report, to show the form of our records, the nature of our work and some of the peculiar circumstances often encountered in it.

The lists and maps indicate the full amount and character of the field investigations. In certain instances, two or more diseases were dealt with during a single trip and but one report or summary written. The asterisk before the name of the sanitary district indicates that more than one disease was prevalent.

Complete reports were discontinued in 1911 because of the constant demand for the presence of the workers in the field made it impossible to prepare suitable detailed reports promptly. Since that time only "summaries" have been written and such statistical data appended as may be essential for reference.

Each member of the State Board of Health receives as part of the quarterly report of the division, a copy of the summary for each investigation. The summaries are typewritten on heavy, sized, punched paper and put into a "common-sense" binder, as the work progresses, for daily reference in the division office. All correspondence, etc., relative to the investigation is filed under the county and its sub-divisions, townships, village, city.

No investigation is undertaken by this division except upon instruction from, or with permission of, the executive officer of the State Board of Health.

Extra copies of the summaries and reports are made for the executive officer who sends a copy of the summary and also the detailed field data, list of cases, etc., etc., with his instructions to the local health officer and other authorities concerned.

FIELD INVESTIGATIONS, AUGUST 1, 1910, TO AUGUST 1, 1912.

County.	Township, Village, City.	Subject.	Date.
Anoka	Anoka city, state asylum	Typhoid	Oct. 10, 1910
	Ham Lake township	Typhoid	Oct. 11, 1910
	Anoka city	Typhoid	Nov. 4, 1910
	Anoka city	Typhoid	Feb. 2, 1911
	Anoka city	Typhoid	Feb. 23, 1911
	St. Francis village	Scarlet fever	Mar. 9, 1911
	St. Francis township		
	Oak Grove township		
	Oak Grove township	Scarlet fever	April 20, 1911
	Linwood township	Smallpox	Feb. 20, 1912
	Anoka city	Typhoid	May 23-25, 1912
	Anoka city	Typhoid	May 28-30, 1912
	Anoka city	Typhoid	June 5, 1912
	Anoka city	Typhoid	June 6, 1912
Becker	Detroit city	Scarlet fever	Mar. 13-16, 1912
	Detroit city	Trachoma	May 6-15, 1912
	Pine Point village	Trachoma	
Beltrami	Bemidji city	Typhoid	Oct. 3, 1910
	Baudette village	Typhoid	Oct. 11-18, 1910
	Spooner village		
	Bemidji city	Typhoid	Nov. 9-10, 1911

FIELD INVESTIGATIONS, AUGUST 1, 1910, TO AUGUST 1, 1912—Continued.

County.	Township, Village, City.	Subject.	Date.
Blue Earth	Mankato city	Diarrhoea, dysentery	Aug. 12, 1910
Brown	New Ulm city	Typhoid	Nov. 22-23, 1911
	Evan village	Scarlet fever	Mar. 28-30, 1912
	Prairieville township		
Carlton	Wrenshall township	Diphtheria	Oct. 30-Nov. 1, 1910
	Atkinson township	Typhoid	Oct. 19-20, 1911
Carver	Waconia village	Scarlet fever	Dec. 19, 1911
	Dahlgren township	Scarlet fever	Feb. 15, 1912
Cass	Leech Lake Agency	Trachoma	May 6-15, 1912
	Walker village		
	Onigum village		
Chisago	North Branch village	Smallpox, chickenpox	Nov. 8, 1911
	Lent township	Smallpox	Feb. 19-20, 1912
Crow Wing	Deerwood village	Typhoid	Sept. 29, 1910
	Brainerd city	Typhoid	June 20, 1912
Dakota	Hastings city	Poliomyelitis	Aug. 26, 1910
	Waterford township	Poliomyelitis	Oct. 15, 1910
	South St. Paul city	Chickenpox	Dec. 11, 1911
	South St. Paul city	Purpura hemorrhagica	Dec. 12, 1911
Dodge	Dodge Center village	Smallpox	Jan. 27, 1912
Douglas	Spruce Hill township	Smallpox	June 20-22, 1911
	Miltona township		
	Leaf Valley township	Diphtheria	July 30-Aug. 1, 1912
	Ida township		
Faribault	Wells village	Dysentery	Aug. 8-12, 1911
	Winnebago village	Diphtheria	Oct. 2-3, 1911
Fillmore	Rushford village	Scarlet fever	Jan. 17-19, 1911
	Lanesboro village	Smallpox	May 5-6, 1911
	Preston village		
	Fountain township	Smallpox	May 6, 1911
	Arendahl township	Smallpox	Feb. 12-13, 1912
Freeborn	Albert Lea city	Typhoid	Nov. 30-Dec. 2, 1911
Goodhue	Zumbrota village	Scarlet fever	Dec. 27-28, 1910
	Minneola township	Diphtheria	Sept. 25-26, 1911
	Zumbrota village		
	Minneola township	Diphtheria	Jan. 29-30, 1912
Grant	Macsville township	Scarlet fever	Dec. 30, '10-Jan. 1, 1911
Hennepin	Greenwood township	Typhoid, dysentery	Aug. 23, 1910
	Bloomington township	Poliomyelitis	Sept. 3, 1910
	Dayton township	Typhoid	Dec. 27-29, 1910
	Eden Prairie township	Scarlet fever	April 4, 1911
	Eden Prairie township	Scarlet fever, German measles	April 17, 1911
	Richfield township	Scarlet fever	April 18, 1911
	Robbinsdale village	Scarlet fever	April 24, 1911
	Orono township	Smallpox	Aug. 26, 1911
	Minneapolis city, Elliot Hospital	Smallpox	Nov. 11, 1911
	Robbinsdale village	Scarlet fever	Nov. 13, 1911
	Orono township	Smallpox	Jan. 24, 1912
	Minneapolis city	Non-specific infection	Feb. 15, 1912
	Robbinsdale village	Scarlet fever	Feb. 17, 1912
	Minneapolis city, U. of M. student	Smallpox	Feb. 24, 1912
	Excelsior village	Scarlet fever	June 19, 1912
	Excelsior township		
Hubbard	Park Rapids city	Trachoma	May 6-15, 1912
Itasca	Bovey village	Typhoid	Aug. 5-9, 1910
	Coleraine village		
	Marble village		
	Taconite village		
	Nashwauk village	Typhoid	Aug. 17-19, 1910
	Coleraine village	Typhoid	Sept. 25, 1910
	Coleraine village	Typhoid	July 13-16, 1911
	Bovey village		
	T. 149N, R. 29W., Camp No. 3, Crookston Lbr. Co.	Typhoid	Nov. 7-8, 1911
	Coleraine village	Trachoma	May 15-27, 1912
	Bovey village		
	Taconite village		
	Marble village		
	Ardenhurst township	Typhoid	June 12-15, 1912
	Alvwood township		

FIELD INVESTIGATIONS, AUGUST 1, 1910, TO AUGUST 1, 1912—Continued.

County.	Township, Village, City.	Subject.	Date.
Kandiyohi	Atwater village	Scarlet fever	May 22-24, 1911
	Lake Lillian township		
	Lake Elizabeth township		
	Genessee township		
	Willmar township, State Hospital for Inebriates	Diarrhoea	Aug. 24-25, 1911
Koochiching	International Falls city	Typhoid	Oct. 23-27, 1911
	Englewod township	Typhoid	June 12-15, 1912
	Northome village		
Lac qui Parle	Dawson village	Scarlet fever, German measles	Dec. 9, 1911
Lake	Two Harbors city	Diphtheria	Nov. 21-23, 1910
	Two Harbors city	Typhoid	Nov. 23, 1910
	Two Harbors city	Typhoid	Feb. 27-Mar. 4, 1912
	Two Harbors city	Typhoid	Mar. 6-9, 1912
	Two Harbors city	Typhoid	April 9-11, 1912
Lincoln	Lake Benton village	Scarlet fever	April 29-May 1, 1911
Lyon	Tracy city	Scarlet fever, poliomyelitis	Aug. 29-31, 1910
	Cottonwood village	Smallpox	Feb. 11-12, 1911
	Lucas township (see Yellow Medicine county)	Smallpox	May 20-21, 1911
	Custer township	Smallpox	July 25-27, 1912
McLeod	Glencoe city	Diphtheria	May 30, 1911
Mahnomen	Beaulieu village	Trachoma	May 6-15, 1912
	Waubon village		
	White Earth Agency and vicinity		
Marshall	Vega township	Typhoid	Oct. 20-23, 1911
	Warren city		
Mille Lacs	Borgholm township	Scarlet fever, measles	Mar. 6-7, 1911
	South Haven township	Leprosy	Sept. 18-20, 1911
Morrison	Little Falls city	Typhoid	April 17-19, 1912
Mower	Austin city	Scarlet fever	May 12-14, 1911
Murray	Lake Sarah township	Smallpox	July 25-27, 1912
Nicollet	St. Peter city, state hospital	Diarrhoea, typhoid	Aug. 11, 1910
	St. Peter city, State Hospital	Diphtheria	May 8, 1912
Nobles	Worthington village	Diphtheria	Nov. 13-15, 1910
	Ellsworth village	Diphtheria	Oct. 4-6, 1911
Norman	Spring Creek township	Typhoid	Oct. 29, 1911
Olmsted	Rochester city	Scarlet fever	Jan. 5-9, 1911
	Rochester city	Scarlet fever	Jan. 11-16, 1911
	Rochester city	Scarlet fever	Jan. 23-31, 1911
	Rochester city	Scarlet fever	Feb. 12-16, 1911
	Rochester city	Scarlet fever	Feb. 18-19, 1911
	Rochester city	Smallpox	May 7-8, 1911
	Rochester city	Smallpox	May 12, 1911
	Rochester city	Scarlet fever	Sept. 26, 1911
	Rochester city	Scarlet fever	April 23-May 1, 1912
	Rochester city	Scarlet fever	May 2-7, 1912
	Rochester city	Scarlet fever	May 9-11, 1912
Otter Tail	Fergus Falls asylum	Typhoid	Sept. 17-18, 1910
	Parkers Prairie village	Smallpox	June 20-22, 1911
	Eastern township		
	Effington township		
	Vergas village	Scarlet fever, German measles	Oct. 29-30, 1911
Pennington	Thief River Falls city	Typhoid	Dec. 20, 1910
	Thief River Falls city	Scarlet fever	Mar. 2-4, 1911

FIELD INVESTIGATIONS, AUGUST 1, 1910, TO AUGUST 1, 1912—Continued.

County.	Township, Village, City.	Subject.	Date.
Pipestone	Ruthton village	Nuisance	June 7-8, 1911
Polk	Johnson township	Diphtheria	July 19-21, 1911
Ramsey	St. Paul city, Hamline University	Typhoid	Oct. 20, 1910
	St. Paul city, County Poor Farm	Leprosy	Jan. 27, 1911
	Rose township, Dept. of Agriculture, U. of M.	Chickenpox	Oct. 25, 1911
	Rose township, Dept. of Agriculture, U. of M.	Chickenpox	Nov. 11, 1911
	Rose township, Dept. of Agriculture, U. of M.	Diphtheria	Nov. 13-24, 1911 (11 trips)
	Rose township, Dept. of Agriculture, U. of M.	Diphtheria	Dec. 21, 1911
	White Bear village	Smallpox, chickenpox	Jan. 18, 1912
Redwood	Lamberton township	Typhoid	Oct. 26-27, 1910
Renville	Cairo township	Diphtheria	Mar. 14-15, 1911
	Cairo township	Diphtheria	April 11-12, 1911
	Cairo township	Diphtheria	April 27-28, 1911
	Fairfax village		
	Hector village	Typhoid	Jan. 18, 1912
	Hector village	Tuberculosis	Jan. 22, 1912
Rice	Faribault city	Typhoid	Oct. 6, 1910
	Lonsdale village	Smallpox	Jan. 25, 1912
	Webster township		
	Erin township	Tuberculosis	Feb. 6-7, 1912
	Forest township		
	Webster township		
	Wheatland township		
Rock	Hills village	Scarlet fever	April 6-10, 1911
	Martin township	German measles	
	Beaver Creek village	Chickenpox	April 10-12, 1911
	Beaver Creek township	German measles	
Roseau	Roseau village	Typhoid	Dec. 18-21, 1910
St. Louis	Duluth city	Typhoid	Aug. 5-9, 1910
	Hibbing village		
	Chisholm village		
	Virginia city	Typhoid	Aug. 17-19, 1910
	Hibbing village		
	Duluth city	Typhoid	Sept. 24-25, 1910
	Duluth city	Diphtheria	Dec. 12-14, 1910
	Duluth city	Scarlet fever	June 2-4, 1911
	Rice Lake township	Smallpox	June 22-23, 1911
	Ely village	Typhoid	Aug. 31-Sept. 1, 1911
	Duluth city	Trachoma	May 15-27, 1912
	Hibbing village		
	Chisholm village		
	Virginia city		
	Eveleth village		
	Ely village		
	Gilbert village		
	Biwabik village		
	Tower (Indian School)		
Scott	Cedar Lake township	Smallpox	Sept. 26-28, 1911
	Belle Plaine borough	Diphtheria	Dec. 19-20, 1911
	Shakopee city	Smallpox, diphtheria	Jan. 3, 1912
	Credit River township	Scarlet fever	Jan. 8, 1912
Sherburn	Becker township	Typhoid	Oct. 31-Nov. 1, 1910
	Santiago township	Diphtheria	Jan. 31-Feb. 2, 1911
	Becker township	Typhoid	April 3, 1911
	Santiago township	Typhoid	Oct. 19, 1911
Stearns	Melrose village	Typhoid	Nov. 26, 1910
	Freeport village	Scarlet fever	Jan. 9-10, 1912
	Sauk Center city	Scarlet fever	July 22-23, 1912
	Sauk Center township		
	Getty township		
Steele	Owatonna city	Typhoid	Dec. 4-5, 1910
	Owatonna city	Tuberculosis	Feb. 2-3, 1912

FIELD INVESTIGATIONS, AUGUST 1, 1910, TO AUGUST 1, 1912—Continued.

County.	Township, Village, City.	Subject.	Date.
Stevens	Morris city	Dysentery	Aug. 25-26, 1910
	Morris city	Diphtheria	Dec. 11-12, 1911
	Morris city	Diphtheria	Dec. 14-15, 1911
Traverse	Wheaton village	Muslinka ditch trial	Jan. 18-19, 1912
Wabasha	Plainview village	Diphtheria	Dec. 2-4, 1911
Wadena	Wadena village	Dairy inspection	Oct. 9, 1910
Washington	Stillwater city	Leprosy	Nov. 2, 1910
Watonwan	Antrim township	Smallpox	Feb. 9-10, 1912
	Fieldon township		
	South Branch township		
Wilkin	Campbell village	Scarlet fever, German measles	April 25-26, 1911
	Kent village	Scarlet fever	May 15-17, 1911
	McCauleyville township		
	Mitchell township		
	Nordict township		
	Robert township		
Winona	St. Charles city	Scarlet fever	Feb. 16-18, 1911
	Norton township	Scarlet fever	Mar. 18-21, 1911
	Utica village		
	Utica township		
	Elba village	Scarlet fever	April 13-14, 1911
	Elba township	Measles	
	Fairwater township		
	Dakota village	German measles	April 14-15, 1911
	Dresbach township		
	Hartford township		
	Hillsdale township	Diphtheria	Feb. 16, 1912
	Winona township		
Wright	Albertville township	Scarlet fever	Feb. 9-10, 1911
	St. Michaels township		
Yellow Medicine	Echo village	Smallpox	May 20-21, 1911
	Echo township		
	Posen township		
	Sioux Agency township		
	Wood Lake village		
	Wood Lake township		
	Porter village	Tuberculosis	Dec. 27-28, 1911
	Canby village	Tuberculosis	April 2-3, 1912

TYPHOID FEVER, DYSENTERY, DIARRHEA.

Water, formerly a great route of infection in epidemics of typhoid fever, dysentery and diarrhea, is now easily and immediately made safe by the hypochlorite treatment. In public and private water supplies subject to continuous or occasional pollution, the hypochlorite should be used without waiting for an epidemic to force this action.

While the hypochlorite treatment is cheap and convenient and gives immediate control of a most important epidemiological factor, **dilute sewage made safe by hypochlorite treatment alone** should not be accepted as a public water supply if there is any practical way of obtaining a clean safe water.

The typhoid fever epidemics briefly mentioned in this report show the remarkable results obtained where the emergency hypochlorite plant has been used.

The first report gave in detail the results of hypochlorite treatment of the polluted water at **Baudette and Spooner** following the forest fire of October, 1910.

In **Anoka** the emergency plant was put into operation February 24, 1911, after the main route of infection had been clearly shown by epidemiological and laboratory data to be the public water supply from the Rum River. The local health officer, Dr. A. T. Caine, had been very energetic in getting the people to boil all drinking water from the taps and the sudden drop in the number of new cases was due to this precaution rather than to the hypochlorite. Bacteriological analyses of the raw and treated river water proved the efficiency of the hypochlorite nevertheless and it is notable that no more typhoid appeared in Anoka after the boiling of drinking water **had been generally discontinued.** Only two cases developed, one a driver for the fire department on April 25th and another a driver for a livery on April 30th. No doubt these two men were careless and drank untreated Rum River water although they denied having done so.

The **Brainerd** epidemic of 1912 proves the need of expert supervision of hypochlorite plants operated by local authorities. Reference to the summary shows what happened under careless management of the plant. It may be said that no case has been traced to city water infection since the operation of the plant was corrected and that only three cases have been reported from Brainerd between June 7, and January 1, 1913.

As a result of the epidemiological work at **Camp No. 3 of the Crookston Lumber Company, township 149 north, range 29 west, Itasca county.** Mr. H. A. Whittaker of the Laboratory Division, devised upon the suggestion of the epidemiologist, an outfit for the treatment of camp or domestic water supplies with hypochlorite. Several lumber camps have been furnished with these outfits with good results.

At **International Falls** typhoid fever decreased rapidly after the hypochlorite plant began to operate, October 25, 1911, and no cases of typhoid have been reported since November 15, 1911, to date, January 1, 1913.

In the **Little Falls** investigation the use of river water could not be excluded in any case. In recent cases it was positively determined and in old primary cases the other usual routes of infection were excluded. Analyses of the water by the Laboratory Division showed sewage pollution and a model hypochlorite plant was promptly installed by the engineering division which is a credit to the city. The civic league, assisted by the school and health departments, entered upon a vigorous campaign against flies, open privies, manure heaps and unsanitary or unsightly conditions in general with excellent results.

The history of the **Two Harbors** typhoid fever epidemic is very important from a public health standpoint because the route of infection for primary cases was water alone; flies and milk were not concerned. The prompt installation of the emergency hypochlorite plant by the engineering division stopped the spread of the disease and demonstrated the efficiency of the hypochlorite method so thoroughly that the most ignorant person was convinced.

In discussing this epidemic the same subject headings as far as possible will be used as were used in writing up the Mankato typhoid fever outbreak. Some additional information is available for the Two Harbors epidemic. Some factors concerned in the Mankato epidemic were not concerned in this epidemic, but for purposes of study and comparison the use of similar subject headings and similar tables seems to be the best plan.

Comparing these two epidemics: In both the infection spread through the public water supply. The Mankato epidemic occurred in June and July, 1908; the Two Harbors outbreak in January and February, 1912. Mankato's population was about 10,000; that of Two Harbors about 5,000. A very large number of transients were concerned at Mankato; at Two Harbors so far as known no transient contracted typhoid fever. At Mankato the preliminary epidemic of diarrhea caused an investigation; the people were warned long before any typhoid fever appeared and instructed what to do. The hypochlorite method had not been developed at that time, but all the other preventive procedures were urged.

At Two Harbors the notification of the outbreak came when the epidemic was at its height. The emergency hypochlorite plant immediately cut off the route of primary infection. The education of the public to prevent secondary infections through contact, food, milk, etc., was begun, the time of the visiting nurse being devoted chiefly to this. The same general methods were used in both epidemics, i. e., house-to-house visits by epidemiologist and visiting nurse, collection of detailed case data, publication of newspaper articles, distribution of handbills to houses, public lectures, household practical demonstrations illustrating the procedure to prevent contact and food infection, the difference being that in Mankato these measures began during the incubation period of the first typhoid fever cases, in Two Harbors, after considerable opportunity for contact infection, had existed for some time. The results in both places were good.

The first notification that typhoid existed in Two Harbors was received February 27, 1912, when a letter dated February 26th, from Dr. J. D. Budd and a telephone message from Dr. M. K. Knauff, health officer, apprised the State Board of Health of the epidemic. The physicians said that forty or fifty cases had developed within twenty days and that the situation was becoming worse daily. The cases were generally distributed over the city; both adults and children were affected. Practically all of the cases were residents who had not been out of the city. All used city water. The season eliminated flies; the nature of the milk supplies eliminated milk, while the distribution and the explosive character of the epidemic pointed to one common factor—water. Our knowledge of the conditions in Two Harbors and our previous experience with typhoid fever in that city confirmed this obvious deduction and indicated exactly what should be done.

Mr. H. A. Whittaker of the Laboratory Division and Mr. J. A. Childs of the Engineering Division at the request of Dr. A. J. Chesley, were instructed to proceed at once with him to Two Harbors. The emergency hypochlorite plant was expressed on the same train, which arrived in Two Harbors the morning of February the 28th. Mr. Whittaker and Mr. Childs immediately began the installation of the emergency hypochlorite plant. Dr. Chesley, after consulting with the health officer, the city officials and the physicians, and obtaining a list of patients, began a house-to-house visitation to get complete epidemiological data. A meeting of the board of health was called, the epidemic discussed, conclusions from the epidemiological data of forty-four cases seen that day, were given, and a positive statement made that city water was the route of infection and that twenty-one days after beginning of hypochlorite treatment of the city water no cases would develop except secondaries infected through contact, etc. It was pointed out that although the season eliminated flies, immediate steps must be taken to prevent secondary infections through contact and food. A visiting nurse was applied for and granted to the board of health by the city council. Certain officials and many other people in Two Harbors doubted the statements of the epidemiologist in regard to the water, of the purity of which they were certain. The physicians did everything in their power to aid in the investigation and the work, and considering the great increase in their practice and that they had to work day and night with very little rest, they deserve the gratitude of the public for their assistance.

The reports of the Laboratory and Engineering Division give the details in regard to the hypochlorite plant and the examination of the water supply. Here only the epidemiological data and the methods of preventing secondary infections will be considered.

In reference to the manner in which the water supply became infected, an article published in the **Journal News** of Two Harbors is quoted. It shows the public indifference to expert advice given years before this disaster occurred. The history of the epidemic also shows how intelligently the public may act upon expert advice when they were convinced by this disaster of its value. This article was printed six years after our first investigation and since the conditions remained almost exactly the same in 1912 as in 1906, only a word or two was necessary to cover the changes since 1906.

Quoted from **Two Harbors Journal-News**, April 4, 1912.

SIX YEARS' HISTORY OF TYPHOID IN TWO HARBORS.

Six years ago, March 28-29, 1906, Dr. H. W. Hill (then assistant director of the laboratory) and Mr. R. H. Whinery (then chemist and sanitary engineer), representing the State Board of Health, made an investigation of the typhoid fever situation in Two Harbors. The epidemiological data were discussed by Dr. Hill in his report to Dr. Bracken, as follows:

"It will be seen that the age of distribution, sex distribution, nationality, occupation and map location of the cases indicate a random infection of the population, which could only be due to

First—A very general source of infection, or

Second—A considerable number of sources, each acting on a limited number of people at about the same time. There are remarkably few contact cases; and in only two cases does the evidence even suggest milk. No intimate social relationships could be traced amongst the various patients—common eating places, banquets, etc. It would seem then that one general source of infection, not extensive or concentrated in action—must have existed, and this no doubt was the water supply.

The possible sources of contamination of the city water supply were discussed by Mr. Whinery in his report to Dr. Bracken as follows:

From a field inspection the writer is led to believe that the possible sources of contamination to the public supply before it is pumped into the mains are five in number and are as follows in the order of their importance:

1. Creek.
2. Leak in inlet pipe near shore.
3. Pump well.
4. Lake Superior.
    a. Storms.
    b. Currents.
5. Sewer outlet.

"**Creek.** The creek, as before mentioned, is in reality a sewer, for at least half of the town of Two Harbors. In fact, Dr. Hill in his investigation found that typhoid feces had actually been deposited in this stream. With certain knowledge, therefore, that typhoid bacilli were introduced into Lake Superior within less than one-half mile of the water works intake, the next thing is to determine whether such bacilli are liable to find their way into the public water supply. There can be no doubt of the fact that such a liability exists. From information furnished by the Branch Hydrographic office, Department of the Navy, located at Duluth, it can be stated that regardless of the direction of the wind, the currents are such as to carry the water from the creek in the direction of the intake. In fact, the wind is the potent factor in setting up currents which would have this effect, since if they are from the lake toward the shore an undertow is created off shore. This undertow would be set up if the wind were from the east, south or intermediate directions. As a matter of fact, the directions from which the prevailing winds in this vicinity come during the months of November, December and January, are southwest and are evenly divided between westerly and northeast in February. During the other months they are from the northeast. According to local authority and to the hydrographer in the branch office at Duluth, there is a well defined current passing down from the north shore of Lake Superior from northeast to southwest. All the indications therefore are that both wind and currents would make the liability of contamination from this source a certainty. On the other hand, the depth of the inlet—sixty feet—would make such a means of contamination look doubtful. If, however, storms of sufficient violence occurred there is no doubt that such contamination would be carried to this depth. To obviate the possibility of contamination from the creek the proper procedure would of course be to cut off all sources of contamination to the creek. To do this the present sewer system should of necessity be extended to include all that territory at present supplying sewage to the creek. A stringent policing of the drainage area of the stream included within the limits of the town should also be enforced.

"**Leak near Shore in Inlet Pipe.** During the latter part of December, 1905, an investigation was made by the town officials to determine whether or not a leak existed in the inlet pipe. As to the results of this investigation, opinion seems to differ, several men interviewed by the writer—members of the water committee, council, and one man of the local board of health—claiming that the inlet pipe is practically intact. The engineer at the pumping station claims, on the other hand, that a considerable leak does exist at the first ball joint in the inlet pipe—about twenty-five feet off shore and in less than ten feet of water. In support of this he says that he has noticed that at times the temperature and appearance of the water is much changed, the temperature being higher and the water becoming very turbid. This, he says, occurs even when there is no high wind or waves. This could only be accounted for by the supposition that there is a leak in the inlet pipe either close to shore or in shallow water, since it would take a violent storm to agitate the bottom of the lake in the vicinity of the inlet. To determine whether a leak did exist, the water was entirely removed from the well and compressed air forced out through the inlet pipe. The appearance of bubbles at the surface of the lake between the pumping station and the inlet would indicate a leak. All parties admit that some bubbles were noticeable, but the engineer is the only one who is of the opinion that they are sufficient to warrant the belief that any considerable leak existed. In the opinion of the writer the presence or absence of such a leak should be positively determined if an uncontaminated water supply is to be guaranteed, since all the remarks in the preceding paragraph concerning winds, currents, etc., would apply to the leak as well as the intake and with more force also if it were found that a leak exists near the shore in shallow water.

"**Pump Well.** Liability to contamination in the pump well is not so evident. This well was cleaned out during the first part of December (1905). That it was not thoroughly done, however, is true, for the writer in taking a sample from this well noticed sticks, and other light material floating on the surface of the water. The inside surface is not lined with cement and there is a large hole in the side of the well where the suction pipe enters. The writer would recommend that the well be completely emptied and thoroughly cleaned. All existing holes should then be filled and the entire inner surface of the well given a thick lining of neat Portland cement. At regular intervals in the future the cleaning process should be repeated and all cracks kept carefully sealed up.

"**Sewer Outlet.** The liability of the public supply becoming polluted from the sewer is very small. All existing currents tend to carry this sewage directly away from the inlet. The intake is protected from this source of contamination by a point of land which juts out between the two and also by a break-water nearly a quarter of a mile in length.

"**Lake Superior.** The water of Lake Superior ought to be a good domestic supply, since it is large in volume and has few large cities discharging sewage into it. The occurrence of high winds and resulting storms might so agitate the bottom even at sixty feet, as to affect the water supply in question, but this is not likely to be of frequent occurrence."

Bacteriological analyses of water samples collected by Dr. Knauff every few days during April and May, 1906, showed an intermittent pollution of the city water by sewage. These analyses confirmed the conclusions made from the epidemiological and engineering data.

From the deaths due to typhoid fever in Two Harbors, the probable number of cases may be calculated. The average death rate in Minnesota is 3½ per cent (according to the 1909-1910 report of State Board of Health, page 42). The death rate for the Mankato epidemic of 1908 was 6½ per cent, practically twice as great as the general average death rate in the state. Estimating from a 7 per cent* death rate basis, the number of cases for Two Harbors is as follows:

	Deaths (reported)	Cases (estimated)
1906	6	85
1907	5	71
1908	3	42
1909	7	100

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*Some deaths probably were credited to Two Harbors, although the patients were infected elsewhere and merely in Two Harbors for treatment.

Dr. Hill collected data on 25 cases originating in Two Harbors in 1906 and on 10 cases infected outside of the city but treated in the hospitals.

January 17-18, 1910, Dr. Hill, Director, Epidemiological Division, and Mr. J. A. Childs, of the Engineering Division, investigated the typhoid fever problem in Two Harbors. In reporting to Dr. Bracken, Dr. Hill discussed the situation as follows:

"Considering the cases month by month, as they would be considered by any one on the ground at the time they occurred, the 9 September cases remain obscure. The four October cases are also obscure. It is difficult to determine much concerning old cases like these now—the people have forgotten dates and facts, essential witnesses have perhaps moved away, etc., and deductions based on four cases are not likely to be strong. The same may be said of the November cases. It is very noticeable that of the twelve primary cases in these three months, but two were adults. As noted beyond, all the cases are explainable now only as water cases.

"Turning to the December and January cases, 22 primary cases were seen, the rest falling in the incomplete class. Of these eight were adults; fourteen under 21; twelve were of school age; sixteen were males; six females; the distribution in the city was fairly uniform; there was no social or other direct connection between them, as a rule; the milkmen differed and there was no history of infection in the milkmen's families; flies would not act, except possibly for the earlier cases, and outdoor closets were not at all common, especially where the cases existed; the children had the same water supply at school as at home; they attended different schools and did not eat their lunches there, but at home; in fact, applying the usual formula of food, milk, water, fingers and flies, the December and January cases are, by elimination, water cases.

"On investigation of the water supply it was found that the conditions existing in March, 1906, when a previous investigation of a somewhat similar but more prolonged outbreak was made, remained practically the same except that a septic tank now treats the sewage from the city north of Fifth avenue. This area formerly drained more or less directly, chiefly by surface wash, into a creek into which the septic tank now discharges. Owing to the installation of a definite sewer system for this district, it would appear that all the sewage from this district now is collected and discharges at the same point in Burlington Bay as did the indirectly collected sewage and surface wash of the same area at the time of the first investigation; in brief, that except for what action the septic tank may exercise, the sewage discharges more direct, more concentrated and from a greater area than formerly. The fact that the earlier outbreak showed at no time more than five cases in any one month, while the present one yielded eighteen in December alone, tends to confirm this.

"Hence the opportunities for contamination of the water supply by the same path traced in the earlier outbreak of 1906 still exist, the chief difference being that, except for the septic tank, they are probably greater.

"Tnis consideraion of the outbreak of December, 1909, and January, 1910, suggests that the earlier cases in October and November may have been due to the same cause. The youth of the cases occurring in these months might at first suggest milk, but the records exclude this. Thus the only conclusion left open to us at this stage of knowledge of the epidemiology of typhoid is that the water supply was responsible at least as far back as October, but that the water has at no time been grossly contaminated, probably a little reaching the supply from time to time, more in November (explaining the sharp increase of cases in December) than before that time.

"Mr. Childs called attention to the fact that many of the earlier cases occurred in the district tributary to the septic tank, and this point may account for the December rise; by more accumulation and overlapping of the amount of typhoid excreta reaching the intake.

"The records of the United States Weather Bureau show a heavy rainfall with snow at Two Harbors about the middle of November, with northwest winds prevailing. The hydrographic bureau indicated in 1906 that a current ran from the mouth of the creek in question towards the intake, regardless of winds."

The calculation based upon a 7% death rate indicates that there were about 185 cases in 1910, the number of deaths from typhoid fever in Two Harbors being thirteen (eleven males, two females, all adults).

Dr. Hill followed up and obtained as complete data as possible for forty-nine resident cases which developed first symptoms as follows:

In September, 1909, five cases; October, five cases; November, ten cases; December, twenty-two cases, and in January, 1910, seven cases. Dr. Christenson reported in March, 1910, five cases; in April, twelve cases. No further reports were made to the State Board of Health until November 23, 1910, when Dr. Budd reported eight resident cases to Dr. Chesley, who was here on account of a diphtheria epidemic.

In 1911 no typhoid fever reports were made to the State Board of Health except for the patients who died. (In April two females, 16 and 26 years; May, one male, 22 years; June, one male, 25 years; July, one female, 14 years; October, one male, 25 years; November, one female, 15 years.)

If seven fatal cases represent 7% of all the typhoid cases in 1911, there were about 100 cases; some of these arising during October, November and December have recently been reported. Their discharges got into the water supply in unusual quantity, owing to the conditions prevailing this year and precipitated the present epidemic. There is no use discussing the present epidemic. Everyone is familiar with it. The hypochlorite treatment of the water was begun as soon as possible after the State Board of Health had been notified. Without doubt there will be some cases besides those due to city water infection. The public has been instructed how to avoid infection through the other routes, i. e., contact, food, milk, flies, etc., and we hope that few such infections will occur.

The most important thing is to decide what should be done to prevent a repetition of the foregoing typhoid history in Two Harbors. This is a problem for the sanitary engineer, and the Engineering Division of the State Board of Health should be consulted. When changes have been made which will absolutely prevent sewage pollution of the water supply, there still remains a most important work. This is the enforcement every day in the year of the Board of Health regulations for typhoid cases."

LOCAL WORKERS.

The nurse chosen by Dr. M. K. Knauff was Miss Catherine Finn and her work was excellent in every respect. In fact, she carried out her instructions so faithfully and so tactfully that there was practically nothing which required the presence of an epidemiologist. This is shown clearly in the following outline of the epidemiologist's visits: He arrived in Two Harbors, 8:40 a. m., February 28th and left at 5 p. m., March 1st, having seen all known or suspected typhoid fever cases; obtained complete epidemiological case data; given each family typhoid circulars II and III, as well as verbal advice about the prevention of contact infections and met with the Board of health and conferred with other city officials in regard to the management of the epidemic. The city council granted the health officer's request for a visiting nurse March 4th and Dr. Chesley returned to instruct the nurse; arrived in Two Harbors 8:40 a. m., March 7th, leaving there at 12:10 p. m., March 9th. Duplicate "spot maps" were made, all new cases were seen and the epidemiological data brought up to date and the nurse's work systematized. At this time a folder entitled "How to Escape Typhoid Fever," was printed by the Journal News and distributed to every house in the city at city expense. Dr. Hill prepared the material for this folder and Dr. Budd delivered an address to the railroad employes which was later printed and, without doubt, was the means of educating many persons in the avoidance of infection.

Mr. G. W. Small, editor of the Journal News, gave the public most timely information in his paper. The city librarian made a special shelf for publications on typhoid fever and advertised the books in order to attract the attention of the public.

The physicians gave talks at various meetings and even the moving picture show got the spirit of co-operation and ran films about typhoid fever.

It was not until word was received that the visiting nurse work had been discontinued, that a third trip to Two Harbors was made. Dr. Chesley arriving at 8:40 a. m., April 10th, made, through the council, arrangements for continuing the work of the nurse, etc., etc., and left at 4:50 p. m., the same day. These facts are mentioned to emphasize the remarks about the good work done by the health officer, visiting nurse, physicians, the press and certain public spirited citizens.

EPIDEMIOLOGICAL DATA.

In addition to the routine epidemiological data (see Dr. Hill's article entitled "Detailed Procedures, Etc.," page 234) the nurse collected special data for the 1912 cases and for members of their families exposed to them, a total of 180 cases and 548 exposed persons.

I. Special Points Concerning Each Patient.

a. Health before the attack—(good, fair, poor.)

b. Previous typhoid (date and remarks.)

c. Qualification of person caring for patient (graduate nurse, hospital trained, not a graduate, "practical" not hospital trained, mother, wife or other member of family.)

II. Special Points Concerning Each Member of Family.

a. Age, sex, present health, previous typhoid.

b. Amount and character of exposure, by contact, use of city water.

c. Length of residence in house.

These data were tabulated under the following headings:

		Concerning the Patient					Concerning the Members of the Families		
Map No.	Case No.	Age Sex Previous Health			Date of Previous Typhoid	Kind of Nurse	Age Sex Present Health		
		Good	Fair	Poor			Good	Fair	Poor

Concerning the Members of the Families—Continued

Exposure—Character and Amount						How Long in House	Date of Previous Typhoid
Used City Water			Contact with Patient				
Much	Little	None	Much	Little	None		

From this general tabulation the different factors were selected which immediately refer to the above mentioned points. In following the order of subjects of the Mankato report to facilitate comparison similar tables are given for Two Harbors:

1912 TYPHOID CASES DIRECTLY OR INDIRECTLY FROM TWO HARBORS WATER INFECTION.

Cases.	Males.	Females.	Total.
Primary	78	84	162
Secondary	9	9	18
Total	87	93	180

At Two Harbors the **hypochlorite treatment** of the water began on the afternoon of February 29th and cases developing first symptoms later than March 15th were very carefully investigated to determine the source and route of infection since our experience in Mankato showed that the average incubation period for typhoid fever is fourteen days. Previous to the hypochlorite treatment there was ample opportunity for water infection, for no precautions had been taken except that certain careful families boiled the water. Cases with first symptoms before March 22d classed as secondary infections, are so classed advisedly as it is impossible to exclude water infection.

The first systematic work against contact infection was begun February 28th but the measures advocated were not generally adopted in families without trained nurses until March 9th when the circulars, "How to Escape Typhoid Fever," were distributed to every house, hotel, school, office, store, etc., in the city and the public had become fully aroused to the dangers of the situation. Therefore it cannot be held that secondary cases developing previous to March 24th indicate that the instruction given for the prevention of contact infection was at fault. Miss Finn was appointed by the health officer as visiting nurse March 5th. She began her work at once but it was about March 10th before she could devote sufficient time to each untrained nurse to be sure that they knew how to avoid contact infection. By this time she had her work so thoroughly systematized and her records in such good order that she sometimes nursed patients through the night to relieve overworked mothers or wives.

The following chart graphically outlines the situation and as the great majority of cases were cared for at home it is readily seen that the physicians, the visiting nurse and the health officer had plenty of work.

That the reporting of typhoid cases had been neglected for years is shown in the quoted article "Six Years History of Typhoid in Two Harbors." In 1911 six deaths were reported as follows:

Died.	Sex.	Age.
April 4, 1911	F.	16
April 28, 1911	F.	26
May 11, 1911	M.	22
June 19, 1911	M.	25
July 21, 1911	F.	14
Oct. 31, 1911	M.	25

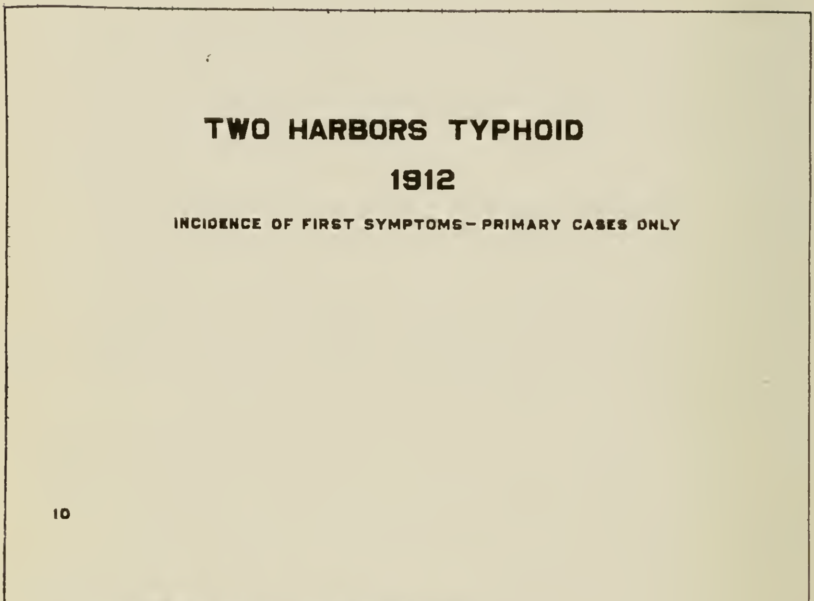
Yet no cases had been reported for 1911.

In addition, the visiting nurse investigated nine cases developing in September, October and December, 1911, but these are not included as part of this epidemic. The five January cases preceding the general outbreak which began in February are included in the chart:

DISTRIBUTION OF CASES IN FAMILIES.

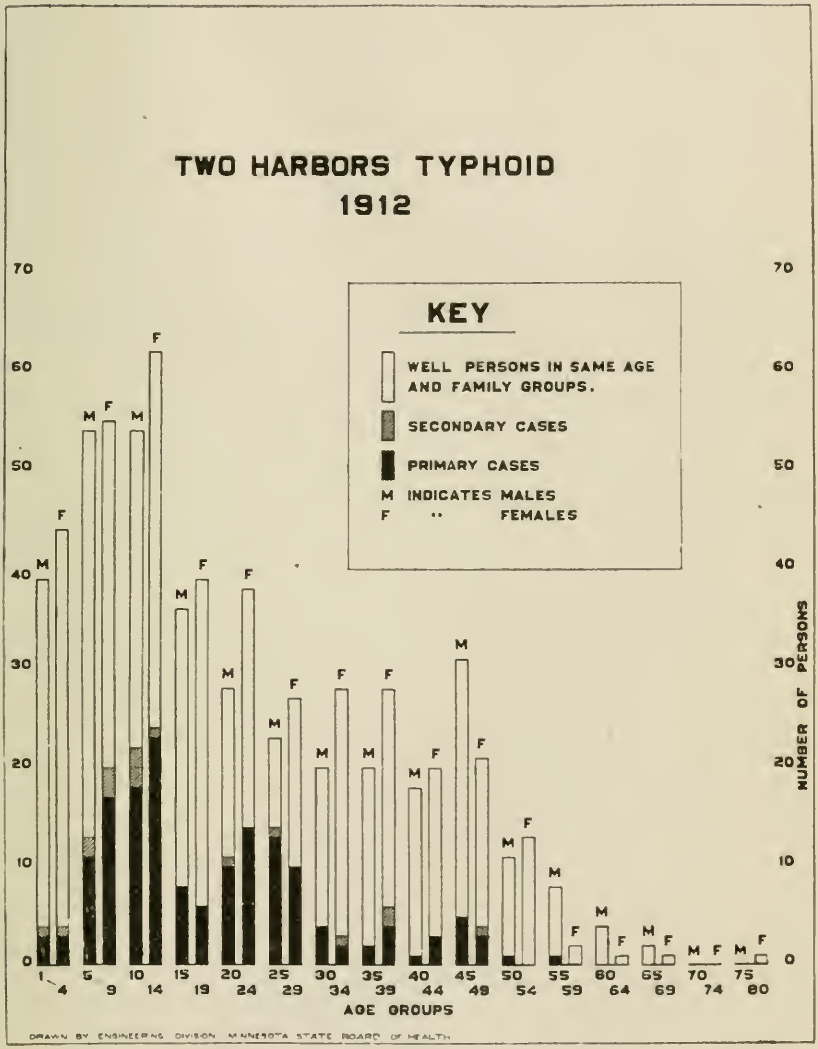
Number of Cases	Primary Only	Number of Cases	Primary and Secondary	Number of Primaries	Number of Secondaries	Total	
						Families	Cases
1	120	120	....	....	....	120	120
2	10	20	9	9	9	19	38
3	2	6	4	6	6	6	18
4	....	....	1	1	3	1	4
....	132	146	14	16	18	146	180

Of 146 families, 14 or about 10 per cent yielded secondaries. In 9 families a primary was followed by a single secondary while in 4 families the primary case was followed by two secondaries. Only one family had more than two secondary cases. Here, three secondaries followed one primary. No walking cases were discovered although a most thorough inquiry was made.



DRAWN BY ENGINEERING DIVISION MINNESOTA STATE BOARD OF HEALTH

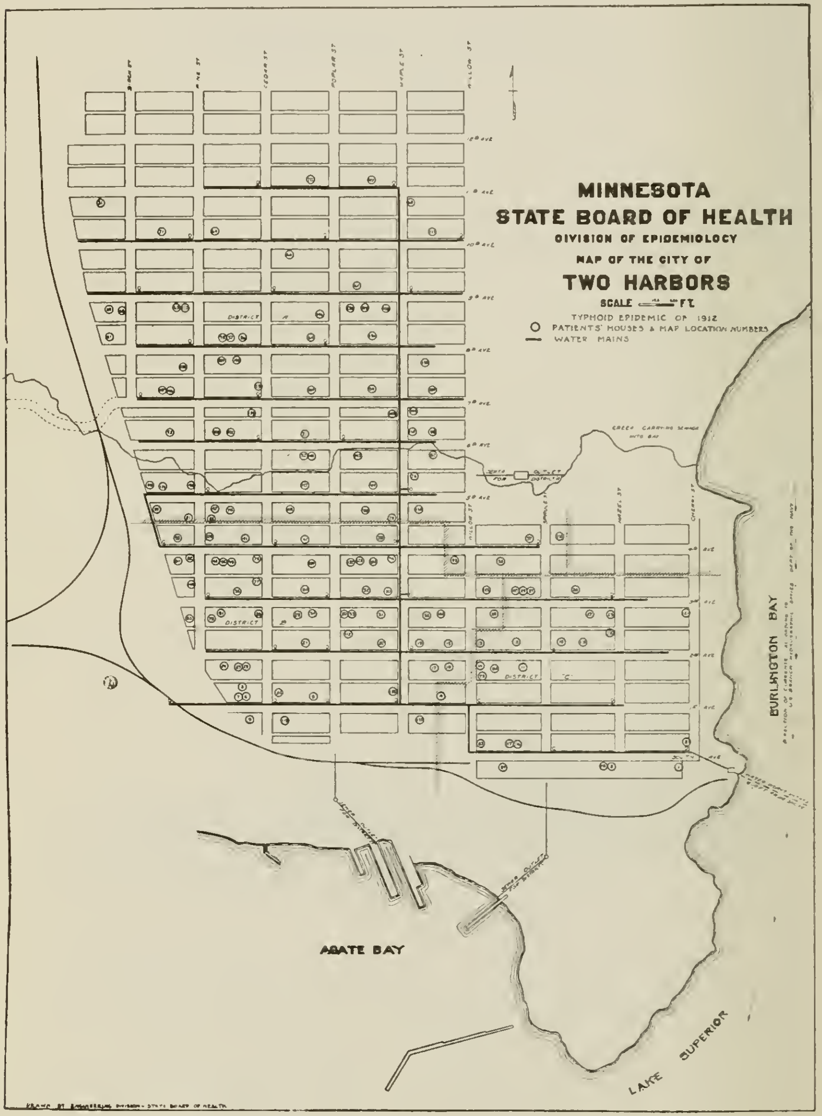
SHOWING THE INCIDENCE OF FIRST SYMPTOMS 1912 CASES.



TWO HARBORS TYPHOID
1912

DRAWN BY ENGINEERING DIVISION MINNESOTA STATE BOARD OF HEALTH

In the Mankato report the general age and sex incidence as compared with the general age and sex composition of the whole population was discussed, in Two Harbors the comparison is limited to the members of the families where typhoid developed. This group, though smaller, would seem to furnish better material for reliable deductions and the total number of persons, males and females in each age group is compared with the number developing typhoid in the following chart:



A study of this chart and of the map indicates that the result of exposure to infection was not influenced by age, sex, or house location except in families where the members drank water from the most northerly mains exclusively.

As stated in the report of 1906 quoted in the newspaper article preceding, the city is divided by a creek flowing east into Burlington Bay. The ridge south of this creek runs, generally speaking, parallel to it but at varying distances, in some places it falls off abruptly to the creek and is very near it, in others the slope to the creek is more gradual but nowwhere is the ridge separated from the creek by more than one east and west water main.

When the hypochlorite treatment was begun, the dead ends of the water mains were flushed out and much more sediment was found in pipes supplying that part of the city south of the ridge than in the pipes supplying the houses north of the ridge. This fact led to the deduction that the bacterial pollution would be roughly proportional to the visible sediment and therefore more cases would appear among the users of water from the mains south of the ridge than among those supplied by mains north of the ridge because of the difference in the size of the dose of infectious material.

As a matter of fact the following table practically proves this deduction to be correct since it shows that the great majority of cases classed as primary infections had ample opportunity to drink water from the lower mains while at work or at school.

The second part of the table gives the cases which presumably used no water from the lower mains, since all were engaged in housework except a four-year-old girl and a three-year-old boy and the pupils attending the Johnson school on Tenth avenue.

CASES NORTH OF RIDGE.

Case No.	Map No.	Used Water From Mains South of Ridge While at—	Sex.	Age.
157	129	Work, electrician	M.	27
20	101	Grocery, clerk	M.	18
72	76	Candy store, clerk	M.	20
111	130	Clothing store, clerk	F.	40
69	57	Meat market, manager	M.	58
141	69	Mercantile company, clerk	M.	29
55	109	Grocery store, clerk	M.	22
57	75	Schools, teacher, manual training	M.	30
143	100	Work, D. & I. R. R., section	M.	20
150	105	Work, D. & I. R. R., engineer	M.	46
99	139	Work, D. & I. R. R., brakeman	M.	17
24	134	Ore docks, laborer	M.	30
9	50	Work, fisherman	M.	48
63	54	Work about town, laborers	M.	22
130	59	Work about town, carpenter	M.	21
151	128	Minnehaha school, Fourth avenue	M.	11
3	113	Minnehaha school, Fourth avenue	M.	7
132	70	Minnehaha school, Fourth avenue	M.	12
96	106	Minnehaha school, Fourth avenue	M.	13
93	58	Minnehaha school, Fourth avenue	M.	13
117	65	Minnehaha school, Fourth avenue	M.	15
161	135	Minnehaha school, Fourth avenue	M.	7
2	74	Minnehaha school, Fourth avenue	M.	12
52	104	Minnehaha school, Fourth avenue	F.	13
37	52	Minnehaha school, Fourth avenue	F.	6
149	110	Minnehaha school, Fourth avenue	M.	14
159	131	Minnehaha school, Fourth avenue	F.	11
33	68	Hiawatha school, Third avenue	F.	12

Case No.	Map No.	Used No Water From South Mains (?) See Note Above.	Sex.	Age.
59	63	Housekeeper	F.	28
10	62	Housekeeper	F.	28
11	52	Housekeeper	F.	21
126	102	Housekeeper	F.	24
144	56	Housekeeper	F.	28
133	60	Housework	F.	30
127	107	Housework	F.	23
105	67	At home	M.	3
156	70	At home	F.	4
79	51	Johnson school, Tenth avenue...............	M.	12
112	56	Johnson school, Tenth avenue...............	M.	7
61	61	Johnson school, Tenth avenue...............	F.	8
129	108	Johnson school, Tenth avenue...............	F.	8
112	56	Johnson school, Tenth avenue...............	M.	7
47	103	Johnson school, Tenth avenue...............	F.	11
60	64	Johnson school, Tenth avenue...............	F.	8
118	136	Johnson school, Tenth avenue...............	M.	14
80	71	Johnson school, Tenth avenue...............	M.	8

A most careful investigation was made to determine the source and route of infection in every case. Contact under circumstances favorable to direct infection existed in all the cases given in the table "Two Harbors Secondary Cases." The earlier cases are classed as "Secondaries" although they used polluted water to some extent before hypochlorite treatment was begun February 29th, and developed first symptoms within the period found to be the average incubation time for typhoid fever in the Mankato epidemic.

TWO HARBORS SECONDARY CASES

Males

Case No.	Age	Occupation	First Symptoms	Infected by Contact with	Primary Case		Nurse for Primary Case	Total No. in Family
					No.	1st symp		
* 20a	27	Carpenter....	Feb. 28	Fellow boarder.	20	Feb. 10	Trained	Seven
* 20b	13	Student	Mar. 4	Fellow boarder	20	Feb. 10	Trained	Seven
20c	21	Carpenter...	Mar. 26	Fellow boarder.	20	Feb. 10	Trained	Seven
23a	14	Student.....	Mar. 10	Brother	23	Feb. 12	Mother...........	Seven
105a	5	At home.....	Mar. 18	Brother	105	Feb. 25	Mother...........	Six
114a	11	Student.....	Mar. 23	Brother-in-law..	114	Feb. 26	Mother...........	Four
160a	13	Student	April 10	Brother	160	Mar. 19	Mother...........	Seven
160b	4	At home.....	April 15	Brother	160	Mar. 19	Mother...........	Seven
136a	8	Student	May 2	Brother........	136	Mar. 1	Mother...........	Nine

Females

Case No.	Age	Occupation	First Symptoms	Infected by Contact with	Primary Case No.	Primary Case 1st symp	Nurse for Primary Case	Total No. in Family
* 6a	8	Student	Feb. 22	Sister	6	Feb. 1	Mother (1 week) . .	Eight
* 5a	5	At home.....	Feb. 27	Sister	5	Jan. 25	Mother...........	Seven
* 5b	10	Student	Mar. 12	Sister	5	Jan. 25	Mother...........	Seven
* 69a	30	Housewife ...	Mar. 6	Father-in-law. .	69	Feb. 22	Trained	Four
* 87a	7	Student	Mar. 11	Boarder	87	Feb. 24	Mother...........	Five
*132a	2	At home.....	Mar. 15	Brother	132	Feb. 28	Mother...........	Eight
42a	35	Housewife...	Mar. 30	Daughter......	42	Feb. 20	42a (Mother)	Three
88a	39	Housewife...	April 9	Son...........	88	Feb. 25	88a (Mother)	Eight
101a	47	Housewife...	April 10	Husband	101	Feb. 25	101a (Wife).......	Ten

*Water infection cannot be ruled out absolutely for cases with first symptoms appearing during the fourteen days after hypochlorite treatment of the water was begun.

When it is considered that twelve of the eighteen secondary cases were children fourteen years of age or less, and that three were untrained nurses who protected the others in the family but finally became infected themselves when exhausted from lack of sleep, hard work and anxiety, the results of the educational campaign against contact infection appear to be good.

In the chart "1912 Two Harbor's Typhoid" the total number of persons in the families with typhoid fever was compared in age and sex groups with the cases of the same groups.

The questions arise, why did so many escape? Why should certain ones succumb to the disease? First, let us consider the character and amount of exposure. Our data show that in 132 families with primary cases only (i. e. water infections) 328 persons remaining well had used much raw city water, 39 had used little and 23 none for drinking purposes. These persons had lived in the houses where the disease appeared for varying periods, one individual only two weeks, another only one month, but all others from three months to twenty-one years, the great majority being old residents of Two Harbors.

Besides the exposure to infection through water which extended over considerable periods these persons were exposed through more or less contact with the patients in the family as follows: 64 had much contact, 112 little and 214 none whatever.

In the tabulation the qualifying words heading the columns under amount and character of exposure through use of city water and through contact were "much," "little," "none." By "much" in the case of water, the daily use for drinking purposes is to be inferred, by "much" under contact, daily association as nurse or assisting in the care of the patient. "Little" under water, means that the water regularly drank was from a different source or was boiled. "Little" under contact indicates that owing to the circumstances the exposed individual occasionally assisted the regular nurse or at odd times attended the patient in order to relieve the regular nurse. The statements of the persons concerned were always carefully reviewed in the light of all the circumstances connected with the family and the tabulation is based more upon intimate personal observation than upon statements made to the nurse.

Second, were those who escaped in better health than those who were taken with the disease? The records show that 374 members of the families having primary cases only, were in good health 8 in fair (about as usual) and 7 in poor (not as well as usual) during their period of exposure, while of the patients themselves, 155 were in good health, 16 in fair and 11 in poor health previous to the attack of typhoid fever. Thus it appears that the state of a person's health does not materially influence the result of his exposure to typhoid infection.

The subject of immunity is important and therefore the data of those who had previously had typhoid are given in the following tables:

PERSONS WHO HAD TYPHOID PREVIOUS TO 1912

1--Persons Having Second Attack in 1912

Case No.	Date of Previous Typhoid	Age	Sex	No. Cases in Family		Person Who Nursed Case	Contact Exposure in Same Family	
				Primary	Secondary		Much	Little
23A	1900	14	M	1	1	Mother	5	....
1	1902	48	F	1	0	Trained nurse	....	1
109	Since 1903	9	F	1	0	Mother	2	....
17	1907	13	F	2	0	Mother	4	....
23	1910	17	M	1	1	Mother	5	....
122	1910	10	M	1	0	Mother	2	....
145	1910	11	F	1	0	Mother	6	....
154	1910	14	M	1	0	Mother	....	3
52	1910	13	F	1	0	Mother	....	7

2--Persons Having No Symptoms in 1912

Exposed to Case No.								
109	Not Given...	8	F	1	0	Mother	1	....
32	Not Given...	36	F	1	0	Mother	....	2
98	Not Given...	37	M	1	0	Mother	....	3
125	Not Given...	48	M	1	0	Mother	....	1
13	Not Given...	26	F	1	0	Mother	3	....
58	Not Given...	45	M	1	0	Graduate nurse	....	4
58	Not Given...	18	F	1	0	Graduate nurse	....	4
38	Not Given...	18	M	1	0	Relation	....	3
131	Not Given...	39	F	1	0	Mother	3	....
102	Not Given...	44	M	1	0	Relation	....	2
140	Not Given...	30	M	1	0	Mother	....	1
88-88A	Not Given...	40	M	1	1	Mother	....	7
108	Not Given...	17	M	1	0	Mother	....	7
40	Not Given...	17	M	1	0	Mother	....	7
40	Not Given...	36	M	1	0	Mother	....	4
30	1877	45	F	1	0	Mother	3	....
45	1882	51	M	3	0	Mother	....	2
136-136A	1892	50	M	1	1	Mother	....	6
53	1892	44	M	1	0	Mother	....	6
28	1894	46	M	2	0	Graduate nurse	....	1
12	1900	38	M	2	0	Mother	....	3
54	1900	24	F	1	0	Mother	....	4
116	1900	18	M	1	0	Mother	....	4
116	1900	19	M	1	0	Mother	....	4
84	1901	45	M	1	0	Mother	....	3
87-87A	1901	30	F	1	1	Mother	2	....
54	1902	25	F	1	0	Mother	....	4
105	1902	38	F	1	1	....	3	....
15	1902	38	M	1	0	Graduate nurse	....	2
115	1904	31	M	1	0	Mother	5	....
136-136A	1906	15	M	1	1	Mother	....	6
136-136A	1906	13	F	1	1	Mother	....	6
63	1907	17	F	1	0	Practical nurse	....	2
12	1907	34	F	2	0	Mother	3	....
123	1907	14	M	2	0	Graduate nurse	....	4
99	1908	42	M	1	0	Mother	....	7
22	1910	12	F	3	0	Practical nurse	....	5
158	1910	9	M	1	0	Graduate nurse	....	4
2	1910	9	F	1	0	Mother	....	3
124	1910	16	F	1	0	....	....	6
29	1910	37	M	1	0	Mother	....	2
79	1910	12	F	1	0	....	....	7
161	1910	9	M	1	0	Mother	....	4
99	1910	20	M	1	0	Mother	....	7
151	1911	31	M	1	0	Mother	....	1
6	1911	16	M	2	0	Hospital nurse	6	....
97	1911	30	M	1	9	Graduate nurse	....	4
85	1911	16	M	1	0	Graduate nurse	....	3
94	1911	22	F	1	0	Trained nurse	....	8

It is evident that the nine persons who developed typhoid fever the second time were not immunized by the first attack. The majority, five, had typhoid fever only two years previously. Of the forty-eight who had typhoid fever previously and did not develop it from the exposure during this epidemic, thirteen had it within two years, the others at varying periods up to thirty-five years previously. The figures are too small for use in comparison or as a basis for deductions but from what we know of anti-typhoid vaccination, it would appear that immunity so derived is probably more lasting and certain than immunity due to a previous attack of typhoid fever.

While nine of the fifty-seven who had typhoid fever previously developed it again in 1912, 171 of the 500 who never had typhoid fever previously had it in 1912. These persons being in the families where cases developed must have had practically the same opportunity for exposure and since the other factors, age, sex, previous health, etc., average up quite uniformly for the two groups, those who had typhoid fever previously and those who did not, these figures are worthy of serious attention. They indicate roughly that with the same chances for infection an individual who has had typhoid fever is about one-half as likely to come down with it again as one who never had the disease.

The seven hundred and twenty-eight persons whose histories have been taken, represent a fair average of the whole population of 5,000, in age, sex, occupational and social groups. It is evident from the known prevalence and the number of deaths during the preceding years from typhoid fever, that a considerable proportion of the whole population has more or less protection from previous typhoid fever. The part of the population not included in our histories, did not have exposure through contact with cases in the same family that those whose histories have been given were subjected to. The number of primary and secondary cases and the qualifications of the person who nursed the primary cases, the size of the family, the age and intelligence of the members, must be considered in estimating the extent of contact exposure.

Another factor worth mentioning is that this epidemic had but one route of infection, the public water supply. Had other routes, such as milk and flies, also been concerned, the study of the epidemic would have been much more difficult.

The milk supply was very thoroughly investigated. The data were tabulated under the following headings:

CONCERNING THE SUPPLY.

Milk Dealer	No. of Cows	Milked by	Milk Delivered		Amount of Butter Sold	Cans, etc., Washed		Typhoid at Dairy
			By	In		By	With	
A	12	Mr. A	Mr. A	Bulk	None	Mrs. A	City water	No

CONCERNING THE CONSUMER—Continued.

Families Supplied			No. Cases in These Families. Used Milk Previous to Typhoid				
Total	Had No Typhoid	Had Typhoid	Total	Regularly	Occasionally	Never	Butter
27	1	26	32	11	4	17	None

A summary of the data shows that thirty-seven different parties sold milk to families where typhoid fever developed. Sixteen families with twenty-one cases were supplied with milk from their own cows. Of the total number of patients, (one hundred and eighty) seventy-eight used raw milk regularly, forty used it occasionally and sixty-two did not use cows' milk at all during the incubation period preceding their earliest symptoms. Throughout the epidemic, rigid supervision was maintained over the milk dealers and milk was sold only from one place where a case of typhoid fever existed. This was a fruit and confectionery store. The patient lived in rooms over the store and was isolated under the care of a very competent nurse. In all other places where typhoid fever appeared, the sale of milk was prohibited. Since, as a rule, the families had but one or two cows and wanted to use the milk for the typhoid fever patients in the family, this regulation was easily enforced.

Seven deaths occurred during this epidemic. The death rate being about 3.9 per cent. All the deaths occurred in Two Harbors and were primary cases.

PRIMARY CASES.

MALE DEATHS.

Age.	Occupation.	First Symptoms.	Date of Death.
25	Fireman	Feb. 8, 1912	Mar. 10, 1912
33	Engineer	Feb. 10, 1912	Mar. 1, 1912
18	Clerk and delivery	Feb. 10, 1912	Mar. 14, 1912
58	Meat market	Feb. 22, 1912	Mar. 8, 1912
45	Conductor	Feb. 27, 1912	Mar. 17, 1912

FEMALE DEATHS.

Age.	Occupation.	First Symptoms.	Date of Death.
20	Housework	Feb. 21, 1912	Mar. 17, 1912
38	Housework	April 1, 1912	April 10, 1912

Practically all of the patients were treated in Two Harbors. Those treated in Duluth and Minneapolis were taken sick while visiting in those cities or were sent to Duluth for treatment after coming down with the disease in Two Harbors. We were unable to trace any transient infected at Two Harbors. This is probably accounted for by the fact that the hotels had used boiled water only, for a long time.

OCCUPATIONS OF 1912 TWO HARBORS CASES.

Occupation.	Males—87.	Females—93.
Minnehaha school	17	21
Hiawatha school	9	16
Johnson school	7	5
High school	6	..
Teacher	1	4
Child at home	6	8
Housewife	..	37
Cook	1	..
Clerk	5	2
D. & I. shops	7	..
D. & I. railroad	9	..
Ore docks	3	..
Laborers	2	..
Butchers	2	..
Carpenters	3	..
Fisherman	1	..
Fireman, water works	1	..
Electrician	1	..
Assistant postmaster	1	..
Druggist	1	..
House painter	1	..
Janitor	1	..
Hospital patient	1	..
Moulder, foundry	1	..

The tabulations, charts and map previously given are part of the system regularly employed in routine epidemiological work. They are kept up to date by transcribing and checking daily the original data written on cards during the day's work. The card index system is essential in field work for it lends itself readily to any arrangement or special classification of material desired.

Each epidemiological case data card bears at the upper left corner the case number, at the upper right corner the map location number on both sides of the card. Primary cases are numbered in order of the date of first symptoms. Secondary cases are given the number of the primary case from which the infection was incurred, and a letter, i. e., secondary case infected from primary case No. 6 would be A6. A second secondary from the same case would be B6, etc.

A card was made for each street and avenue giving certain information about cases located thereon.

Male				Female			
6th Ave.	Age	1st Symptom	Map No.	6th Ave.	Age	1st Symptom	Map No.
No. 424	48	Feb. 2, 1912	50	No. 616	6	Feb. 18, 1912	52

In connection with the spot map, certain tables are used, the headings of which with sample entries are given below:

DISTRIBUTION OF TYPHOID CASES.

Location Data				Case Data		
Map	Street Number	Water	Sewer	Family Name	Primary	Secondary
1	120 South Ave	City	No	E—	26	
				S—	82	
2	201 South Ave	City	No	F—	6	A6

SEQUENCE OF TYPHOID CASES.

Typhoid Cases in 1911 reported only by death certificates.

Case	Patient	Age	Sex	Date of Death	Map
1	D—., Sara Susan	16	F	April 4, 1911	

(Six deaths in 1911.)

1911 Cases Found and Investigated by Visiting Nurse.

Case	Patient	Age	Sex	Date 1st Symp.	Map
A	F—., Edward	16	M	Sept. 10, 1911	2

(Eight primary cases and one secondary)

1912 Cases Immediately preceding the General Outbreak

Case	Patient	Age	Sex	Date 1st Symp.	Map
1	H—., Mrs	48	F	Jan. 3, 1912	114

(Five cases with first symptoms in January. See chart showing incidence of first symptoms 1912 cases.)

Beginning of General Outbreak

Case	Patient	Age	Sex	Date 1st Symp.	Map
5	H—., Lillian........................	8	F	Jan. 25, 1912	73

(175 cases followed the preceding. See chart mentioned above.)

The visiting nurse made a **daily report** to the health officer giving a summary of the day's work with comments and recommendations. Through the use of duplicate case data cards, spot maps, etc., the progress of the epidemic was followed in the office of this division by checking up from the reports of the visiting nurse. In this way the epidemiologist, although not present in Two Harbors, was enabled to understand the situation and give suggestions and advice intelligently at any time.

The earliest symptoms of the last primary case, No. 162, appeared April 19th. This man worked in the sewer and his infection is charged to contact with sewage while at work.

REMARKS.

The epidemics cited, where hypochlorite has been used to cut off the infection by the water route, show that this part of the problem has been solved, but the other common routes of infection "flies, food, fingers" remain. If the summaries are consulted it will be seen that in a large number of the epidemics of typhoid fever, diarrhea and dysentery investigated, these routes were the ones concerned.

The **"food and fingers" routes** never can be controlled to the extent that the water and fly routes of infection can be controlled. Habit is stronger even than fear or knowledge. In order to escape infection through contact with the patient, certain things must invariably be done or avoided. No matter how particular the individual may be in aesthetic ways, **training, continued until every detail has become part of an established habit,** is necessary for the protection of the individual. Otherwise typhoid germ-laden discharges will travel the ordinary everyday routes that normal discharges continually follow even with careful people, fingers to food, fingers to mouths.

The **fly carriage of infectious discharges** can be controlled and the first and most important point in the campaign is education of the public. Fly posters prepared for the State Board of Health by Prof. F. L. Washburn, state entomologist, have been put up in schools, postoffices, railroad stations and other public places throughout the state. Moving pictures, lantern slide demonstrations and illustrated talks have been given in the schools, "Swat the Fly" articles have been printed in the newspapers generally, but the concrete example of a practical, cheaply but properly constructed, fly proof, sanitary privy has been neglected.

The need is great in every unsewered town for such a practical demonstration. In many villages the traveling public or the farmer can find only **a filthy, stinking, tumble down outhouse, swarming with flies,** and with no nearby facilities for washing of hands. If the decency, the intelligence, the regard for personal cleanliness and the public spirit of a community were measured according to its accepted and we must assume, desired standards for the disposal of human discharges, how shocked would some of the prominent and influential citizens be at the results!

Anyone who looks, smells and reflects, as he travels and still doubts that epidemic typhoid fever, diarrhea and dysentery may be caused by fly carriage of human discharges, lacks appreciation of things as they are.

Public Health Bulletin No. 37 of the United States Public Health Service and Farmers Bulletin No. 463 of the United States Department of Agriculture have been distributed widely by this division in villages and country districts where the sanitary privy is conspicuous by its absence.

The practical demonstration consisting of a sanitary privy, with a good garbage can, a fly trap, a fly poster and printed matter explaining the danger of infection through carelessness and how to avoid infection, may be provided in places where typhoid, diarrhea or dysentery epidemics appear.

One investigation was undertaken to get figures on the money losses due to rural typhoid which would never have spread had there been a suitable place and trained nurse provided for the isolation and care of the first case brought home sick. The report is given in full and should be read carefully. It will be found in the summaries under Becker township, Sherburne county, page 244.

Ice, as a factor in the spread of typhoid fever, diarrhea and dysentery, troubles local health officers immensely because of the lack of appreciation in the minds of the people, of the relative importance of the different routes of infection. To give once and for all, the local health officer the answer to the question raised by the public: "Is ice dangerous?" a short paper by Dr. Hill entitled "The Non-relation of Natural Ice to Typhoid Fever, Diarrhea and Dysentery" is printed in this report.

I shall deal chiefly with the epidemiological relationships of ice to typhoid fever and also by special request, to dysentery and diarrhea. This subject is of peculiar interest to me, for my business in life is that of an epidemiologist. As such it is my duty to visit localities infected wtih outbreaks—diphtheria, scarlet fever, smallpox, poliomyelitis, tuberculosis—anything transmissible, including, of course, typhoid fever—over the 83,000 square miles of Minnesota. In the last fifteen months I have visited about ninety-nine places where epidemics existed; studied conditions, made an epidemiological diagnosis and prescribed treatment. Thirty-six (36) of these outbreaks were typhoid outbreaks (usually accompanied by dysentery); eight outbreaks were outbreaks of dysentery or severe diarrhea without typhoid fever. We have in Minnesota much typhoid and of every standard epidemiological variety; water typhoid, milk typhoid, food typhoid, finger typhoid, fly typhoid; each with its own general characteristics, usually to be recognized through long practice almost at a glance. What is the relation of this typhoid fever and this dysentery to ice in Minnesota? Typhoid is abundant, natural ice is abundant and practically the only form extensively used. Do these two facts relate to each other?

ICE AS A POSSIBLE EPIDEMIOLOGICAL FACTOR—THEORETICAL CONSIDERATIONS.

The quantitative relationships of ice to other forms of possible typhoid conveyors has not been sufficiently emphasized. I believe that I first pointed out some years ago, that the total annual ice supply of a given community does not usually exceed the equivalent of one or two days' water supply for the same community—and hence that if the same proportion of ice were used for drinking purposes as obtains in the case of water (an assumption I think in excess of the truth) the water used for drinking purposes in the form of ice would form but about $\frac{1}{3}$ to $\frac{2}{3}$ of 1 per cent of the water used for drinking purposes in the form of water. Hence, in a community afflicted with a typhoid-polluted water supply, the ice could not be counted on to supply more than $\frac{1}{3}$ to $\frac{2}{3}$ of 1 per cent of the total water-borne typhoid cases—even were it arranged to have all the ice taken from the same contaminated source and even if it were possible to have all the ice so taken used without any of those changes constituting the natural purification of ice of which we are all aware. Allowing for these inevitable changes, even artificial ice, frozen from such a water supply and used within a day or two of freezing, could not, on account of the purification obtained before, during, and after freezing, be held responsible for more than 1-15 to 1-30 of 1 per cent of the total water-borne typhoid. How much less can natural ice be held accountable, the self-purification of which is much greater because of the nature of natural freezing, the conditions under which it occurs and the relatively prolonged action of the freezing temperature. In Philadelphia, a polluted water supply is held to have furnished an average of 4,000 to 6,000 cases per year, for forty years. Had this same typhoid-polluted water furnished the sole ice supply of Philadelphia, and supposing that ice did not purify itself at all between freezing and actual use, only 20 to 40 cases annually could logically be attributed to this source. Allowing for the known purification which natural ice undergoes it would be inexcusable for any epidemiologist to attribute to the natural ice even if all of it were taken from the same source as the water, an average of more than 3-10 case per year or one case in three years.

PRACTICAL CONSIDERATIONS.

Notwithstanding that every consideration of the subject from whatever standpoint leads inevitably to the same conclusion, that ice is not an appreciable theoretical factor in typhoid fever, it is always of the greatest importance to make sure whether or not the theoretical considerations, worked out, are realized in practice. We think that natural ice may convey typhoid fever, because in the extensive American literature of typhoid fever, one such instance is apparently authentically described.* So we know also that it is possible to be struck by a meteor—because authentic descriptions of such are on record. But from a practical standpoint the admitted possibility of being struck by a meteor should not concern us 1-1000th part as much as the question "What are the chances of anyone being so struck?" This can only be determined by finding how many people are injured every year and of these how many are actually in fact sufferers from meteors. So with typhoid fever. The question is not can natural ice convey typhoid, but how many persons do in fact actually contract typhoid infection through natural ice?

It has been estimated that 250,000 people suffer from typhoid fever in the United States every year. For the twenty years past during which sufficient attention has been paid to typhoid fever to elicit the source of outbreaks, 5,000,000 people have so suffered. From this number 1/1200 of 1 per cent have been attributed to natural ice, all occurring in one outbreak, already referred to.

How would one recognize a natural ice outbreak if it occurred? First of all it would occur before June. Second, the bulk of the cases would be on one iceman's route, other icemen's routes escaping. Third, the ice would be found to be from grossly polluted sources. Fourth, it would be found to be young ice, i. e., recently frozen. Fifth, the cases would develop from the ice water drinkers chiefly. Sixth, the ice would have been placed in and not around the water. Seventh, all other sources would have to be most carefully eliminated. The ice outbreak above referred to does not correspond with these requirements.

These are **mutatis mutandis** the characteristics we would demand of an alleged milk outbreak before concluding that it was in truth a milk outbreak.

Do such outbreaks occur? I am, remember, speaking for Minnesota, the land of waters, with its great rivers, its 10,000 lakes, its cold winters supplying natural ice for everyone, close at hand, and its hot summers making that ice desirable and greatly desired as a beverage; with its outbreaks of typhoid, winter and summer; its outbreaks of dysentry, winter and summer. In all this richness of material is ice a factor?

Let me give instances.

Certain of our communities, perhaps most of them now, have excellent water and excellent ice supplies—these we may eliminate from consideration at once. Certain of our communities have had—also some of them still have—water supplies not only questionable but definitely typhoid producing—and some of these communities have at the same time excellent ice supplies.

Certain of our communities have had very bad water and used the same water as ice supply. One in particular was notable for having typhoid fever every winter when the river, used for both water and ice supply froze over in the fall. The typhoid disappeared promptly when the ice broke up in the spring. This happened year after year.

Here then is a conclusive test. Ice was taken from a river actually producing typhoid at the time—in one outbreak I personally studied, to the extent of 7 per cent of the community—yet the ice from that river did not produce a single case—and this history was repeated year after year.

Certain of our communities have had typhoid contaminated supplies and took their ice from even worse contaminated waters. There have been communities which, not content with cutting ice from the same point in the river as that from which they secured their contaminated water, actually went below their own sewers and cut ice from water containing not alone the contamination above, but also the additional contamination of their own sewers. These are actual cold-blooded facts. Yet these cities did not suffer from typhoid which by any stretch of the imagination could be attributed to ice.

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*Hutchings and Wheeler, American Journal Medical Science, October, 1903. I believe the evidence presented inconclusive, however.

Finally there is the community with an excellent water supply and an ice supply from a contaminated source, and there again we do not find—absolutely do not find—typhoid attributable to ice—seldom typhoid of any kind, except such as may occur incidentally from temporary causes.

As to dysentery and diarrhea. I have studied some twelve of these outbreaks as distinct from the dysentry and diarrhea outbreaks which usually accompany typhoid fever. In one, 400 of the 600 inhabitants were affected, in another, 2,000 out of a population of 8,000, in another 6,000 out of a population of 10,000. These three and two others were sudden overwhelming outbreaks, stopping short as soon as the cause was found and abolished. All five were absolutely and conclusively traced to water and ceased when the water supply was purified. The remainder were of a different type, straggling, scattered, in the end massive, long-drawnout over months. They occurred indiscriminately amongst the city and village populations, in camps, in institutions, at summer resorts, and did not correlate in time, extent or incidence with ice, or ice consumers. These outbreaks were not water outbreaks, but distinct fly and contact outbreaks.

Finally the very extensive, serious and enormously fatal outbreak of summer diarrhea amongst children from which children in almost every community in the country suffer annually during the summer months not only fails to correlate with the parallel increased use of ice during that period, but is chiefly found amongst those who do not use ice at all and who for this reason largely fail to so preserve their food supplies, especially the chief food of the small children who chiefly succumb, milk, that intestinal disturbances may be avoided.

TO SUM UP.

Ice, were it equally subject to contamination as water and without natural purification processes, could not on account of its relatively small use, constitute a factor accounting for over two-thirds of 1 per cent of the water-borne typhoid (which of course would be a much smaller proportion of the total typhoid of the country), even if its use were as general as the use of water.

Natural ice because of its great powers of purification might be taken from the same water sources as produce typhoid fever, yet could not be held responsible for over 1/200 of 1 per cent of the total water-borne typhoid.

As a matter of fact, and on account of that curious trait of the human mind which compels us to strain at the gnat and swallow the camel, the average ice supply is from better sources than the average water supply, although the latter is at least two hundred times more important. In practice I can see no evidence whatever that over 1/1200 of 1 per cent of the water-borne typhoid cases in this country have been or could be legitimately attributed to natural ice and I think even this figure is greatly exaggerated

I should be recreant to my profession and to this opportunity to appeal to you gentlemen if I omitted to call attention to the fact that at times ice may be and has been an excuse for infecting water with typhoid fever from typhoid infected hands.

In ordinary handling of ice with tongs or even with hands in ordinary summer weather, infection of even the surface of the ice is almost impossible, because of the constant stream of melting water which is apt to bathe and cleanse the surface after such handling. But when ice is used for cooling water by dropping the ice directly into the water, the hands of the persons so handling ice should be clean—rather ice should not be so handled at all, at this, the only really critical point in its course from source to consumer's stomach.

Yet on railroad trains, in hotels, in restaurants, in private houses, ice is so dropped into drinking water by hands, and often by dirty hands. Hands, alas, are often dirty. They are used daily by everyone for every possible purpose and are especially employed to cleanse the body. They are therefore likely to become daubed with the body's discharges. All our foods, that are handled at all, are almost certain to receive some of the discharges, nose, mouth, bladder or bowel, of the person handling them—unless that person be a highly trained nurse or bacteriologist. Hence, the man with typhoid, puts typhoid discharges into our food, and incidentally into the drinking water if he puts ice into the water with his hands.

While therefore taking all due precautions to see that your ice, so far as you are responsible for it, is from proper places, properly stored, shipped and delivered, carry your good work a little further; warn your customers, that they may easily nullify all your efforts and attack the only weak point in the ice armor by handling the ice with dirty hands.

Professor Sedgwick referred to the fact that cases of epidemics from ice on record were rather shaky. He asked me particularly to look over the one great American epidemic which had been accepted usually and casually enough by authorities on this question, which is that at the State Hospital at Odgensburg, N. Y., where forty people were supposed to have been infected by ice taken from the St. Lawrence River. I must confess that I had not read this for a number of years and had forgotten all about the details. However, when I came to read it critically, a very curious thing came to light. Three of those people who had typhoid came down with a temperature of from 103 degrees to 104 degrees F. on the second of October. Within four days, five more had come down. Six days before the first case, October 2, which would mean September 26, the ice house, to which the infection was later attributed, was opened and put into use for the first time. If it could be shown that this ice house had nothing to do with the epidemic, the whole case against natural ice as the cause of this epidemic falls to the ground. Now, gentlemen, typhoid fever does not begin with a temperature of 103 or 104 degrees. Men might easily be **first found** with that temperature; it is the commonest thing in the world, because the patient usually does not go to bed until after having been sick for several days. Those men were sick several days, at least, before they developed the temperature of 103 to 104 degrees. That would throw the date when they actually became sick back to about the date of the opening of the ice house. Now, typhoid fever requires an average of two weeks from the time of infection before any symptoms develop whatever. There is, therefore, internal evidence in that article, describing this epidemic and attributing it to ice, exactly as it is written, and taking the deliberate, exact statements of the men who wrote it, **to show that that epidemic could not possibly have come from ice**; because those men concerned, the typhoid patients who developed the disease, **were infected, actually took these typhoid bacilli into their systems about the middle of September, at least fifteen days before the ice house was opened at all.** I am very glad that this subject came up, because it gives me an opportunity to criticise an epidemic which has been regarded as classic, which was quoted by all the authorities, and on a point which does not seem to have occurred to any one else; and I must say it was due to Professor Sedgwick asking me to read it over again, because I had accepted it as every one else had, without much consideration, because of the apparent conclusiveness of the rest of the evidence.

Ice is a very difficult subject on which to make an epidemiological address, because there is almost nothing to say of it from an epidemiological standpoint. My great interest in the subject is to get rid of it and get it out of the field of epidemiology entirely, so we will not be bothered with it any more. People will stand for poor water supplies and bad food supplies and bad milk supplies and dirty hands and all other factors of typhoid fever with a glad heart, so long as they can kick about the ice. I want these people to stop putting their whole time and attention on the ice, holding meetings of women's clubs and everything else to protest about it, and to get right down and stir up something that amounts to something from an epidemiological standpoint!

The methods pursued in our field work are graphically described in the following article by Dr. Hill, entitled "The Detailed Procedures to be Followed in an Epidemiological Determination of the Origin of a Typhoid Outbreak."

The rapidity with which the routes of spread and source of a typhoid outbreak can be determined by modern epidemiologists and the practical infallibility of the results are incredible to those who have been accustomed to slow moving inquiries and investigations extending over weeks or months.

So drastically revolutionary are the achievements of modern epidemiological investigation that this incredulity is not unreasonable and can hardly be removed, except by a clear statement of the methods used.

The fact that the new epidemiological methods are the very converse of the old is in itself an explanation of their immense relative efficiency.

To make clear this complete inversion of the older methods an illustration may be offered.

Suppose a hunter is asked to find and kill a particular wolf whose depredations of the night before are indicated by bodies of dead sheep lying in a pasture. He may proceed in either of two ways to his task. He may gather an army of assistants and send them out to follow the outline of a thirty-mile circle, centering on the slaughtered sheep, with the hope of thus picking up trails of various wolves, intending then to work inward along each trail to determine if it be the trail of the guilty wolf, i. e., until satisfied that it does or does not lead to the dead sheep. Of course they might encounter the trail of the guilty wolf at once—but much more likely they would encounter many other wolf trails, each of which they would have to "run out," before at last they strike the right one. Indeed, they may not strike the right one at any time, because the one guilty wolf may have his range wholly within the circle the hunters are following—and in that case of course they could not cross his trail at all.

No real woodsman would follow such a plan. Rather he would go alone straight to the slaughtered sheep and work outward along the only trail that leads from them. That trail must be the trail of the guilty wolf and of that one only. It must lead directly to where that guilty wolf is now. Such a plan cannot fail to find not only a wolf, but **the** wolf, and once that wolf is found it can be put out of action forever.

The older investigators usually approached a typhoid outbreak on the lines of the first plan outlined above, arguing thus:

First—Water is by all means the most likely route—we will therefore study the water supply or supplies, take samples, analyze them, and in two, three or four weeks, decide whether or not we have evidence to show that the water supply or supplies or some one or more of them are or are not polluted.

Second—Milk may be the route—we will therefore investigate the milk supplies of the community in detail, trace each to the original dairies or farms from which it comes, and since water is after all the chief route used by typhoid fever, we will investigate the water supplies of each dairy, taking samples and analyzing them—a matter of two or three weeks.

Third—Food is so ubiquitously used that it is almost hopeless to search for the route of infection there. However, we will look over the markets and stores, delve into the ice chests and inspect the back premises. If we find dirt and disorder, we can at least recommend that these be cleared up.

Fourth—Fingers and (in flytime) flies are ubiquitous. The physicians must guard against transfer by the former. If we find many flies, we must have manure piles and garbage taken up and removed because flies breed in them.

In brief, the older investigator's idea of a typhoid investigation consisted in flooding the community with inspectors of water, milk, markets, restaurants, dairies, back alleys and grocery stores; analyzing, examining, probing the whole community from top to bottom, comparing notes, following clues, working especially in the slums—digging up engineering records, street department records, vital statistical records, interviewing physicans, talking to mass meetings of citizens—and usually coming away two or three weeks later with volumes of information and the epidemic still running. Whatever of field information was collected could not be interpreted fully until all reports and analyses were complete—and the mere bulk of the material was so great that the task of collation alone took precious time, to say nothing of getting out of it the essential facts. But the modern public health expert working alone or at most with one associate is ashamed to spend over three days in finding the channels of infection and their approximate source, and usually can announce indisputable and incontrovertible conclusions within twenty-four hours after he begins.

How is it possible that one man can find essential facts in twenty-four hours by the new method than ten men often failed to find in as many days by the old? The writer has tried both methods, and the reasons are extremely clear.

There has appeared upon the scene a new figure—the public health detective. He is equipped with training, facilities, and experience for the ready clinical recognition of the numerous forms of infectious diseases, with their modifications and combinations; he is familiar with the wiles of the enemy which lead astray the amateur and the uninitiated; he has a trained nose for the trail; he has the ability to get the information he needs from the ignorant, the unintelligent, even the deceptive; and he, above all, is a specialist in his line, placing undiverted energies wholly upon his task. Finally, he has one simple guiding principle—that of going directly to the **known cases** and working the trails **outward from them.**

To illustrate the general principles, let us suppose notification be received that a typhoid fever outbreak exists in a far off community. The public health detective packs his grip and goes. He knows no details; he has never heard of this particular community before; he has not even any general information about the character of the country; he enters the community with no preconceived ideas. But he does know how typhoid fever originates and how it spreads. Water, milk, food, flies and fingers are the routes—typhoid cases ore typhoid carriers the sources. His duties are to find both; and to find them, not as a scientific amusement, or as a matter of record; not to furnish food for speculation—above all not to make a show of doing something—but **to stop the outbreak;** and then to advise measures to prevent recurrence.

The public health detective on entering the community affected by typhoid fever does not first examine the water supply, the milk supply, the sewage disposal system, the markets, the back alleys, the dairies, or anything else. **He goes directly to the bedsides of the patients.** Of course he must obtain the names and addresses of the patients from someone—from the local health officer, if he has them; from the attending physician, if the health officer has no list; from the lay citizens themselves, if no one else is immediately available. The more complete the list, the faster he can work, because then he is not compelled to hunt up the cases personally. But if there be no list, he begins making one himself. **His intention is to see just as many patients as he can,** for each furnishes evidence and he wants it all. But he knows that it is not always necessary at this stage to see absolutely all the patients, so long as he sees the majority.

Reaching the patient's* bedside, his investigation begins. Automatically, almost mechanically, he decides whether or not the patient has typhoid fever or not. Satisfied on that point, his first question is not, "Tell me all the different water supplies you have used, or all the sources of milk you have used." The first question is, "When did you first show the earliest symptoms of the disease?" Why? Because this date once fixed, the date at which infection entered the patient's mouth is fixed also, i. e., a date between one and three weeks previous to the date of earliest symptoms.** Remember that at this stage the detective may not have even an inkling as to which of the usual factors, water, milk, food, flies or fingers, is involved. Still less can he guess which particular water supply, milk supply, etc., of the many possible ones, may be the guilty one. But the answer to this question reduces possible routes **to those used by this patient** not at anytime but **during a specific period,** i. e., from one to three weeks preceding his date of earliest symptoms.

Not yet, however, are the milk and water questions offered. The second question is, "Where were you during that period?" Why? Because if the patient were not in the community during that period, he could not have contracted his infection within it, and does not belong to the outbreak under examination at all but to some other. He is, in brief, an "imported case" and while of course he is to be supervised lest he spread his infection to others, he cannot help to locate the source of the main outbreak—**unless perchance he be himself that source,**

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*If the patient is a child or delirious or not strong enough for an interview, or speaks only some foreign tongue, the relatives, friends or associates must supply the information.

**The occasional exceptions do not affect the validity of this statement as a practical working rule.

i. e., the introducer to the community of the original infection. If he be an imported case he is noted for further reference and the detective goes to another patient. If not, the questions continue. But not yet is water or milk or flies mentioned. The third question is, "Were you associated during your period of infection with any then known typhoid case?" Why? Because such association, especially if intimate, makes it more than probable that the case under examination received his infection from the preceding case, rather than from any general route and that he is therefore a "secondary" case. If he had such associations, this is noted for further reference and the investigator passes on to another bedside. If not, the questions continue and now at last take up milk, water, food, etc., but of course only so far as to determine those used by the patient during **his infection period.**

Then the investigator passes to the next patient. What has he learned so far? Nothing much yet. But he has narrowed the possible routes of infection to certain water supplies, certain milk supplies, certain food supplies, etc., i. e., those used **by the first patient during a certain period,** and he has done this in thirty minutes—in scarcely the time it takes for the old style investigator to get his bottles ready to collect his first water sample!

At the bedside of the second patient, the same inquiries in the same order are made. If this second patient be an imported case, or a secondary case, he also is merely noted for future reference. If he be a primary, however, the origins of his drinking water, milk, food, etc., during his infection period are also ascertained. Perhaps he coincides with the first patient in every detail of alimentary supplies, in history and associations. If so, nothing much has been added to the detective's knowledge. But more than likely, dissimilarities have developed. Since the responsible water supply, milk supply, etc., must be one of those water supplies, milk supplies, etc., **used in common by primary cases** all those not common to both of these primary cases may be dropped from consideration (except in rare instances of multiple routes). Thus, if both have used the same water, water from that origin remains as a possibility. But if the water supplies have been different **water is eliminated from the question entirely.** If the milk supplies are identical, milk remains as a possible route of infection; if not, **milk is eliminated from the question entirely.**

In brief, provided the information obtained be reliable, and it is a part of the public health detective's training to distinguish at a glance truth from falsehood, the honestly mistaken, or forgetful, or stupid replies from the reliable ones—and above all never to believe anything (to the extent of recording it) unless it is checked, confirmed and established as a fact, the modern investigator has in one hour narrowed his investigation to a point which the old style investigator often would not reach for weeks.

And so from patient to patient the inquiry proceeds. In the course of the day the investigator has seen perhaps thirty patients. The tabulation (probably already made in his own mind) shows, say, three imported cases, five secondaries, two uncertain or indefinite. The remaining primary cases show in common, say, one water supply only, the milk, etc., varying; or one milk supply only, the water, etc., varying; or no connection except attendance at some one social function.

Going straight to the route thus indicated, the public health detective quickly confirms the indications of his results. He **knows** that the route indicated must be the guilty one for **only** that route can account for **all** the **cases.** He concentrates on that route until the evidence is complete—when and how that route became infected, when and by what sub-routes the infection was distributed, why it infected the patients found and not others, etc.

In this illustration I have assumed complete ignorance on the part of the epidemiologist as to everything connected with the community he is investigating, except what he finds by cross-examining the patients. As a matter of fact, every epidemiologist, however much a stranger to the particular community he enters, begins to learn about it from the moment he enters it.

Thus almost unconsciously he notes the size of the town and compares it with the number of cases reported as existing; if it is summer time he almost automatically notes the presence or absence of open toilets in the back yards, of manure piles and of garbage cans—all bearing upon fly infection. If it is winter time or the community be well sewered, he does not even consider flies. If the cases are grouped in one quarter of the town, while the public water supply extends all over it, he tentatively eliminates the water supply, before he asks a question. If good surface drainage and a sandy soil exist, or driven wells are chiefly in vogue, he tentatively eliminates well water—even before he registers at the hotel.

This is not and cannot be a complete synopsis of all the combinations of circumstances which the epidemiologist meets. It is intended to illustrate his methods and to show why they are incredibly rapid and incredibly accurate—how they eliminate speculation and guarantee a correct solution—which means of course the achievement of the great end, the finding of proper measures for suppression.

As soon as the route is indicated, he must **go to that route,** and establish beyond peradventure that it was in truth responsible. A water supply cannot convey typhoid if typhoid fever discharges have not entered it. There is no object in attributing an outbreak to fly infection from toilets into which typhoid feces have not been discharged at such a time as to account for the cases. A milk supply, not handled at some point by an infected person, nor adulterated at some time with infected extraneous matter cannot convey typhoid. Whatever his results, they cannot be true unless they are consistent—they should not be accepted unless they are provable—and proved.

If the public health detective is familiar with the community where the outbreak occurs, including its water supplies, its milk supplies, the sociological relationships of its people, etc., etc., he can often tentatively determine the cause of the outbreak by a mere inspection of the names and addresses of primary cases, especially if platted on a map of the community, taking into account also the time of year, and other general points. But such deductions while often wonderfully reliable, can never be as conclusive and satisfactory as are the results of an investigation by even a total stranger, if the investigation be conducted as above described.

Once the main route of the typhoid outbreak is discovered, what should be done?

Water Supplies—If the contaminating material can be excluded from the supply, this should of course be done instantly and hypochlorite should be added at once after cutting out the contaminating source, to secure disinfection of the water already in mains, reservoirs, etc., making sure, by blowing out dead ends, etc., that the hypochlorite reaches every part of the system. Thereafter nothing whatever is needed concerning the water supply, except to see that new contamination is not introduced.

If, as often happens, the contaminating material cannot at once be excluded from the supply, order the water boiled and begin at once the construction of a hypochlorite disinfecting plant. (The Minnesota State Board of Health maintains a portable plant, capable of treating at least 1,000,000 gallons of water per day. This plant costs less than $50.00 to build and set up ready for work. On detecting a water outbreak of typhoid or dysentery, the portable plant is shipped to the community affected and is usually in operation within twenty-four hours of receipt of notification of its need. In such cases orders to boil the water are superfluous; because the hypochlorite reaches effectively every part of the water system before the order reaches effectively one-tenth of the citizens. As soon as the hypochlorite treatment is installed measures for permanent reformation of the supply are begun. This may take weeks, months or years and the hypochlorite treatment in some cases must remain a permanent feature of the supply.

Milk Supplies—For milk outbreaks, the guilty supply should be cut off or pasteurized, unless and until the actual contaminator (milker with walking typhoid, milkman who is nursing a sick relative, carrier, etc.) is located and excluded from handling the supply. When this latter can be and is done, no further action is needed. Of course a thorough disinfection of all cans, bottles and other apparatus possibly contaminated should be done at once in all cases.

Flies—In fly outbreaks, immediate liming of all outdoor toilets, the prevention of soil pollution by the inhabitants, and the fly-proofing of toilets are the quickest and best methods for immediate results. The abolition of flies is a hopeful idea to pursue, but the exclusion of existing flies from infected discharges is much more practical and almost infinitely quicker.

Food Supplies—Food outbreaks are usually due to one lot of infected food, long since eaten or otherwise disposed of and usually little can be done about it. When, however, the food (as in the case of milk) was infected by a handler, who may still be handling new supplies, the handler should be located, if possible. Otherwise the particular article involved should be excluded or used only after cooking.

Fingers—Finger outbreaks can be handled only by supervision of existing infected persons, their nurses and associates.

Every typhoid outbreak becomes a finger outbreak at some stage or other, whatever its original cause, i. e., the primary cases can be prevented by cutting off contamination from the main conveyor (water, milk, flies, etc.); but secondary cases can be prevented only by immediate attention to **every** existing infected person.

Hence **every** typhoid outbreak should result in the immediate appointment of a visiting nurse or equivalent officer, whose sole duty it is to visit every day the existing and new cases, instructing the attendants in the care of discharges, the care of their own hands, etc., the prevention of sale of food, milk, etc., by infected persons or from infected houses, etc. In addition the epidemiological search for missed cases and carriers should be continued as long as new known cases continue to develop. This most important second stage in the control of an epidemic does not call for description here. Like the finding of the origin of the primary outbreak, the finding of missed cases and carriers is based upon detective principles, and depends primarily upon the epidemiologist.

Finally, publicity is needed. Publish abroad the cause of the main outbreak, and warn everyone of the dangers of the secondary infection from existing cases. Too often both public and official opinion consider the danger over when the guilty water is purified, the guilty milk shut out, etc. As a matter of fact cases from the original cause will develop for a period of three weeks after the main route has been abolished (due to tyhoid bacilli ingested from the main route before it was purified). Further, each primary case is likely to give rise to secondaries. Hence **every case, primary or secondary, whenever developing,** is a separate focus of the disease for spread by contact—chiefly fingers, and every typhoid epidemic must be supervised for three months at least, often longer, before typhoid fever is abolished from the community.

The following card has been found useful in Minnesota for securing data from typhoid patients:

EPIDEMIOLOGICAL REPORT ON A CASE OF TYPHOID FEVER.

Face

NAME IN FULL SEX AGE
PRESENT ADDRESS OF PATIENT *CITY
VILLAGE
TOWNSHIP
(In a City or Village Give Street and House Number, Name of Hospital, etc.; in a Township Give Name and Location of Farm. Mine, etc.)
DATE OF BEGINNING RESIDENCE AT PRESENT ADDRESS: MONTH DAY 19
PRESENT STATUS OF CASE (RECOVERED; CONVALESCING; STILL SICK; DEAD*)
PRESENT ATTENDING PHYSICIAN
(Name and Address)
DATE OF EARLIEST SYMPTOMS (Please Determine Accurately) MONTH DAY 19
Note—The Date of Infection Averages TWO WEEKS Previous to This Date.
FIRST SEEN BY PHYSICIAN: MONTH DAY 19
NAME AND ADDRESS OF THIS PHYSICIAN
SIGNED: DR. OF MINN. 19
*Strike Out Words Which Do Not Apply. Date

Reverse

PATIENT'S OCCUPATION DURING THREE WEEKS BEFORE THE EARLIEST SYMPTOMS OF TYPHOID APPEARED?
(Also Give Name of Employer and Address of House, Office, Mine, Factory, etc., Where Patient Worked During These Three Weeks)
WHERE WAS PATIENT LIVING?
(Name Every Eeating and Rooming Place with Dates for Each Place During the Three Weeks Before Earliest Symptoms Developed)
MILK USED BY PATIENT?
(Name and Address of Milkmen Supplying Patient During the Three Weeks Before Earliest Symptoms Developed)
WATER USED BY PATIENT?
(Name and Location of Stream, Lake, Well, or Other Supply During the Three Weeks Before Earliest Symptoms Developed)
WAS PATIENT ASSOCIATED DURING THESE THREE WEEKS WITH ANYONE PREVIOUSLY SICK WITH TYPHOID FEVER? IF SO GIVE DETAILS.
(Date of Association; Name and Present Address of Such Associate. State Relation to Patient as Father, Mother, Sister, Brother, Fellow-Boarder, etc.)
SINCE THE DATE OF PATIENT'S INFECTION HAS ANY ASSOCIATE DEVELOPED TYPHOID SYMPTOMS?
(Name and Address of All Such Cases)
PHYSICIAN'S VIEW OF SOURCE OF INFECTION?
(Fingers; Flies, Food; Milk; Water, etc.)
HAS ANY OTHER RECENT CASE BEEN TRACED TO SAME SOURCE?
(Name and Address of Such Case or Cases)

LIST OF INVESTIGATIONS.

TYPHOID FEVER, DYSENTERY, DIARRHEA.

Fifty-eight epidemiological investigations of typhoid fever, dysentery and diarrhea were made during the biennial period Aug. 1, 1910 to Aug. 1, 1912, in thirty counties. The field work required one hundred thirteen days. No reports or summaries for investigations made between Aug. 1, 1910 and Jan. 1, 1911, are included since the work was covered in the first report of this Division.

TYPHOID FEVER.

County.		Township, Village, City.	Date.
Aitkin	(H)	Aitkin village	December 15, 1911
Anoka	(H)	Anoka city, State Asylum	October 10, 1910
	(H)	Ham Lake township	October 11, 1910
	(H)	Anoka city	November 4, 1910
	(C)	Anoka city	February 2, 1911
	(C)	Anoka city	February 23, 1911
	(H)	Anoka city	May 23-25, 1912
	(H)	Anoka city	May 28-30, 1912
	(C)	Anoka city	June 5, 1912
	(C)	Anoka city	June 6, 1912
Beltrami	(H)	Bemidji city	October 3, 1910
	(H)	Baudette village	Oct. 12-18, 1910
		Spooner village	
	(C)	Bemidji city	November 9, 1911
Brown	(C)	New Ulm city	November 23, 1911
Carlton	(C)	Atkinson township	Oct. 19-20, 1911
Crow Wing	(H)	Deerwood village	September 27, 1910
	(H)	Brainerd city	June 20, 1912
Freeborn	(C)	Albert Lea city	Nov. 30-Dec. 1, 11
Hennepin	(H)	Greenwood township	August 23, 1910
	(H)	Dayton township	Dec. 27-29, 1910
Itasca	(H)	Bovey village	August 5-9, 1910
		Coleraine village	
		Marble village	
		Taconite village	
	(H)	Coleraine village	September 25, 1910
	(H)	Nashwauk village	August 17-19, 1910
	(C)	Coleraine village	July 13-16, 1911
		Bovey village	
	(C)	Twp. 149 N., R. 29 W., Camp No. 3, Crookston Lumber Co.	Nov. 7-8, 1911
	(C)	Ardenhurst township	**June 12-15, 1912
		Alvwood township	Oct. 23-27, 1911
Koochiching	(C)	International Falls city	
	(C)	Northome village	June 12-15, 1912
		Englewood township	
Lake	(C)	Two Harbors city	November 21, 1910
	(C)	Two Harbors city	Feb. 27-Mar. 4, '12
	(C)	Two Harbors city	March 6-9, 1912
	(C)	Two Harbors city	April 9-11, 1912
Marshall	(C)	Vega township	Oct. 21-22, 1911
		Warren city	
Morrison	(C)	Little Falls city	April 17-19, 1912
Nicollet	(H)	*St. Peter city, State Asylum	August 11, 1910
Norman	(C)	Spring Creek township	October 29, 1911
Otter Tail	(H)	Fergus Falls, State Asylum	Sept. 17-18, 1910
Pennington	(C)	Thief River Falls city	December 21, 1910
Ramsey	(H)	St. Paul city, Hamline University	October 20, 1910
Redwood	(H)	Lamberton township	Oct. 26-27, 1910
Renville	(H)	Hector village	January 18, 1912
Rice	(H)	Faribault city	October 6, 1910
Roseau	(C)	Roseau village	Dec. 18-20, 1910
St. Louis	(H)	Hibbing village	**August 5-9, 1910
		Chisholm village	
		Duluth city	
	(H)	Hibbing village	
		Virginia city	**August 17-19, 1910
	(H)	Duluth city	September 24, 1910
	(C)	Ely city	Aug. 31-Sept. 1, '11
Sherburne	(H)	Becker township	Oct. 31-Nov. 1, '10
	(C)	Becker township	April 3, 1911
	(H)	Santiago township	October 19, 1911
Stearns	(H)	Melrose village	November 26, 1910
Steele	(C)	Owatonna city	Dec. 4-5, 1910

DIARRHEA.

County.		Township, Village, City.	Date.
Blue Earth	(H)	*Mankato city	August 12, 1910
Kandiyohi	(C)	Willmar township, State Hospital for Inebriates	August 24-25, 1911
Nicollet	(H)	St. Peter city	**August 11, 1910

DYSENTERY.

County.		Township, Village, City.	Date.
Blue Earth	(H)	Mankato city	**August 12, 1910
Faribault	(H)	Wells village	August 8-12, 1911
Hennepin	(H)	*Greenwood township	**August 23, 1910
Stevens	(H)	Morris city	**August 25-26, 1910

C=Dr. A. J. Chesley. H=Dr. H. W. Hill.

*Another communicable disease investigated at same time.

**Dates appear in two different places, but days are counted but once.

SUMMARY.

Typhoid Fever, Anoka City, Anoka County, February 2 and 23, 1911.

BY A. J. CHESLEY.

Request of Dr. A. T. Caine, health officer.

Reason—Prevalence of typhoid fever in Anoka and state hospital. Source of infection as determined by health officer questioned by certain parties.

Inspector, with health officer, visited cases, took full epidemiological data. Dairies were visited by inspector or health officer.

Result—Rum River water determined as a medium of infection for primary cases. Other probable mediums of infection were excluded, imported cases were determined, the necessity for chemical and bacteriological water analyses shown, and the local board of health findings were supported. Emergency hospital plant installed in pumping station by Engineering Division, February 23d, after analyses of water by Laboratory Division.

Inspector left Becker 4:55 p. m., February 1, 1911, reported in Minneapolis 5:35 p. m., February 2, 1911. Left Minneapolis February 23, 1911, returning 9:00 p. m., February 23, 1911.

SUMMARY.

Typhoid Fever, Anoka City, Anoka County, Minn., May 23-25, 1912, and May 28-30, 1912.

BY H. W. HILL.

Request of Dr. A. T. Caine, health officer.

Reason—Cases of typhoid fever coming down, three or four a day; suspected milk supply exonerated by local health officer. No other source could be detected.

History—Anoka had been fairly free of typhoid fever. Since the last outbreak from the public water supply in 1911, but scattering cases had occurred at intervals. The population contained numerous persons previously affected, now possible carriers. The hypochlorite treatment of the water supply was distrusted so much that few drank the city water, which was used, however, for washing teeth, sprinkling vegetables, etc. High water made people suspicious of wells, despite the sandy soil.

Results—After exhaustive search for the main route of infection, and elimination of public water supplies, wells, flies, milk and contact, the fact that nearly all cases were confined to one ward, and all cases dealt with one grocer, made it likely that food infection was responsible. Very many clues were followed, all the buttermakers for this grocer were seen and finally a farm was found from which butter was sold to the grocer during the sickness and convalescence of an unreported case of walking typhoid in a hired girl.

All patients were seen and instructed, a visiting nurse employed and warnings through newspaper articles and dodgers given. From thirty-five to forty cases, with six deaths, had occurred at last accounts. Especial warnings concerning non-flyproof toilets for the discharges of those now sick, and against the handling of food stuffs by sick or convalescents were given.

Left Minneapolis May 23, 8:50 a. m., Northern Pacific, returning May 25, 4:17 p. m., Great Northern, and left Minneapolis May 28, 8:50 a. m., Northern Pacific, returning May 30, 4:17 p. m., Great Northern.

SUMMARY.

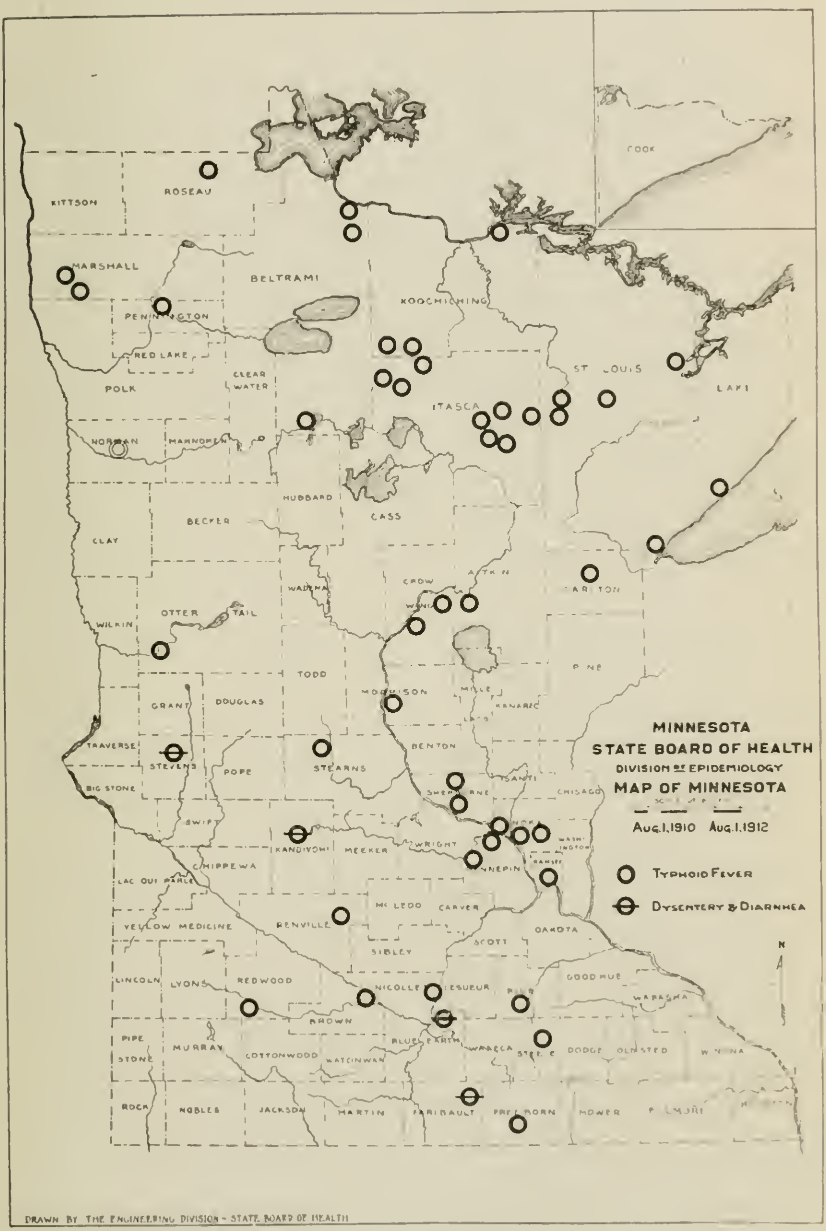
Typhoid Fever, Anoka City, Anoka County, June 5-6, 1912.

BY A. J. CHESLEY.

Request of Dr. A. T. Caine, health officer.

Reason—To complete the investigation of typhoid made by Dr. H. W. Hill, May 23-25, and 28-30, 1912.

History—See summary of Dr. Hill's investigation.



See List on Pages 238 and 239.

Inspector made spot-map for visiting nurse; instructed her about the collection of data, etc.; visited certain dairies with health officer, and assisted Mr. B. M. Mohler, of the Laboratory Division, in the collection of data and water samples.

Results—Evidence obtained from parties direct and from examination of well water and of blood of a suspected carrier by the Laboratory Division, confirmed Dr. Hill's deduction that the carrier was the source of infection, and that butter handled by this carrier was the route of infection. Adequate precautions were instituted at once, and the danger from this carrier ceased.

Inspector went to Anoka by stage; returned by train on June 5 and 6, 1912.

SUMMARY.

Typhoid Fever, Bemidji City, Beltrami County, November 9, 1911.

BY A. J. CHESLEY.

Request of Dr. E. H. Marcum, Bemidji.

Reason—To interview typhoid patients from Crookston Lumber Co., Camp 3, Itasca county, and to investigate other typhoid cases.

History—Health officer had not reported typhoid cases to State Board. St. Anthony Hospital handles, through contract, many typhoid cases from a large territory. Mrs. Smith's Private Hospital occasionally takes typhoid cases.

Inspector visited hospitals, interviewed patients, tabulated typhoid cases admitted since January 1, 1911, interviewed physicians, followed up convalescents and Bemidji and Nymore village, to inspect conditions and to give them typhoid circulars. Met Mayor J. C. Parker, discussed typhoid in camps, arranged to send camps emergency hypochlorite outfits and instructions to his three lumber camps at Cedar Spur, Beltrami county.

Result—Collected data on twenty-eight cases in Camp No. 3, Crookston Lumber Co., and seven from Nymore, three from outside Bemidji, and eighteen treated in hospital since January 1, 1911. Health officer promised to report typhoid cases properly hereafter.

Inspector left Blackduck 10:10 p. m., arrived in Bemidji 11:20 p. m., November 9, 1911. Left Bemidji 11:40 p. m., November 9, 1911, arrived in Minneapolis 9:00 a. m., November 10, 1911.

SUMMARY.

Typhoid Fever, Brainerd City, Crow Wing County, June 20, 1912.

BY H. W. HILL.

Request of Dr. R. A. Beise, health officer.

Reason—Sudden outbreak of typhoid fever.

History—A previous outbreak, due to the public water supply, had been met by installation of hypochlorite plant. Evidence existed that this plant was not uniformly operated, and that the hypochlorite itself had not been of standard strength. Mr. H. A. Whittaker, chief of Chemical Division of State Board of Health Laboratories, had reported on public water supply unfavorably, May 30, 1912.

Inspector accompanied health officer in visiting all available (ten) patients and investigated numerous possibilities, concluding that the public water supply alone would account for all cases. This fitted also with accounts of scattering cases occurring in the past few months.

Results—Advice concerning boiling the water had already been published. This was to be renewed until the hypochlorite treatment was replaced on a proper basis. The visiting nurse, who was on a vacation, was to be recalled and employed to prevent secondaries. Outdoor toilets, where used, were to be disinfected and flyproofed.

This investigation was incidental to presence of inspector in Brainerd as lecturer for the State Board of Health in the University Extension movement.

SUMMARY.

Typhoid Fever, Camp No. 3, Crookston Lumber Co., Township 149 N., Range 29 W., Itasca County, November 8, 1911.

BY A. J. CHESLEY.

Request of Dr. E. H. Marcum, Bemidji.

Reason—Twenty-eight men of Camp No. 3 sick with typhoid in St. Francis Hospital, Bemidji.

History—Camp of one hundred and twenty-five men was established August 23d. September 23d new men from Minneapolis were added to the crew. John R——— developed typhoid October 16, 1911; other cases followed, all beginning with diarrhea. Mess hall, bunk houses and privy vault open to flies, dug well sixteen feet deep in clay, open to pollution by dirty hands drawing water by pail and pole, men weak from diarrhea assisting cook, favored extensive infection.

Inspector took bacterial and chemical specimens, Nos. 12321, 12322, and blood for Widals from Minneapolis recruits of September 23, 1911. Camp No. 2, two miles distant, had similar environment, but no typhoid because it had no carriers. Bunk house water pails had floating tin cups, permitting finger infection of cups and water. Changed cups to long-handled dippers; recommended that ailing men go to hospital for observation to prevent possible contact infection; that privy be daily dosed with lime. Camp was well managed and kitchen well kept. Few flies present.

Result—Five of twenty-five Widals of Minneapolis recruits were positive. Three acknowledged recent typhoid. This accounts for typhoid infection through flies, contact, etc. Special outfits and directions for hypochlorite treatment of camp water were forwarded by Laboratory Division. Foreman will strictly enforce recommendations; re lining privy, washing hands, long-handled dippers, suspects to hospital, hypochlorite in water.

Bacteriological examinations of water by Laboratory Division:
No. 12321, 3,900 bac. per c.c.; colon bac. 1 and 100 c.c.=present.
No. 12322, 400 bac. per c.c.; colon bac. 1 c.c.=0.100 c.c.=present.

Inspector left Minneapolis 7:40 p. m., November 7, 1911, arrived Blackduck 5:30 a. m., November 8, 1911. Left Blackduck 10:00 p. m., arrived Bemidji 11:20 p. m., November 8, 1911.

SUMMARY.

Typhoid Fever, International Falls City, Koochiching County, October 23-27, 1911.

BY A. J. CHESLEY.

Request of Dr. G. F. Swinnerton, health officer.

Reason—Twenty-four residents developed typhoid since September 1, 1911.

History—Pollution of Rainy River being inevitable, Dr. Hill in 1910 advised hypochlorite treatment of city water. Typhoid patients from camps, mines, villages, etc., in a large territory are invariably present in hospitals at International Falls and Fort Francis, Ont. Infectious discharges of convalescents may enter Rainy River from house-boats, small craft, logs, two saw mills, several landing camps and Ranier village up stream; also down stream logs brought by train from Little Fork and Black Rivers and dumped above Rainy River dam. Health officer had warned citizens to boil drinking water.

Inspector visited thirty-four patients at hospital and residences to collect data of present epidemic and old unreported cases; telegraphed for emergency hypochlorite plant; visited milk dealers, checked customers, etc., inspected premises, took photos on tour of inspection up Rainy River to show factors of pollution; with Assistant Engineer J. A. Childs arranged for and assisted in installation of hypochlorite plant; collected bacteriological and chemical samples of city water before and after hypochlorite treatment. (See Engineering and Laboratory Divisions reports.)

Results—No case was traced to milk infection. The large number of typhoid patients drinking water directly from the river, while working near, and the school children who first drank unboiled city water when school opened proved city water to be the source of most infections.

Inspector left Minneapolis 7:40 p. m., October 23, 1911, Northern Pacific Railway, arrived International Falls 8:40 a. m., October 24, 1911. Left International Falls 7:00 p. m., October 27, 1911, for Crookston via Bemidji.

SUMMARY.

Typhoid Fever, Northome Village, Englewood Township, Koochiching County, Ardenhurst and Alvwood Townships, Itasca County, June 12-14, 1912.

BY A. J. CHESLEY.

Request of supervisors of Englewood township and Dr. G. F. Swinnerton, International Falls.

Reason—Several Northome residents and visitors developed typhoid, and one died.

History—H. J. Engleking, village recorder, write re P. —— family, who went May 25th to International Falls hospital. Dr. Swinnerton wrote re other cases and one death which he learned about. Dr. Monahan, upon request, collected epidemiological data for P. —— cases. Dr. Hill did same for cases in hospitals at Bemidji and Brainerd while on "University lectures" trip.

Inspector saw available cases (six sick and three recovered), collected water samples from city supply and wells in Northome; looked up suspected cases in Englewood and Ardenhurst townships; collected blood for Widal tests; distributed hypochlorite and gave written instructions for its use to city water users; advised measures to prevent spread through flies, food, contact, etc.; wrote for further data on cases not seen.

Results—Source of infection of first case unproven, but water from Bartlett Lake (also used for city supply) is probably correct. Other cases also used city water supply regularly or occasionally, including several who are contact or food secondaries. In fact, fifteen cases had opportunity for contact and food infection as well as water infection, and cannot be attributed to any one source exclusively. Water analysis show pollution in four of five wells. The natural drainage from sinks and the school septic tank make the lake water liable to sewage contamination when the snow goes off or heavy rains occur.

Proper measures to stop epidemic were started, although the data were very incomplete because so few cases were at home.

Left Minneapolis June 12, 7:00 p. m., arrived Northome June 13, 6:15 a. m. (Northern Pacific and Minnesota & International.) Left June 14, 9:40 p. m., arrived Minneapolis 9:30 a. m., June 15, 1912.

SUMMARY.

Typhoid Fever, Little Falls City, Morrison County, April 17-19, 1912.

BY A. J. CHESLEY.

Request of Dr. N. W. Chance, health officer.

Reason—About twenty-five cases of typhoid fever had occurred within a year. Twenty had developed since February 1, 1912. The Mississippi River water was suspected to be the route of infection.

History—Mr. H. A. Whittaker, of the Laboratory Division, collected water samples at Little Falls and made inquiries concerning the cases April 11, 1912.

Inspector interviewed the health officer and physicians and listed cases. With Mr. Gross, of the board of health, visited cases and obtained epidemiological data.

Results—The use of river water could not be excluded in any case. From the most recent cases the use of river water was positively determined. For the primary cases the other usual routes of infection could be eliminated. The danger of infection through flies and from privy vaults to shallow wells will be offset by cleaning and liming of vaults and flyproofing of outhouses. Two cases were infected while working with a threshing crew. These and certain other cases are being followed up for more complete data. The health officers will enforce regulations. The civic league agreed to support him in a fly campaign and general cleaning up.

Left Minneapolis 7:40 p. m., April 17, arrived Little Falls 11:05 p. m. Left Little Falls 7:45 p. m., arrived Minneapolis 10:30 p. m., April 19.

SUMMARY.

Typhoid Fever, Ely City, St. Louis County, August 31, 1911.

BY A. J. CHESLEY.

Request—Dr. O. W. Parker, health officer.

Reason—Eight scattered cases of typhoid fever developing at intervals in Ely. Fly infection suspected as route of infection.

History—Typhoid fever and dysentery are prevalent at Ely as on other parts of the Range every year. The usual conditions, unscreened kitchens, careless habits, open outdoor toilets and an abundance of flies favor transmission of the disease. First case in summer of 1911 developed about June 20th. All cases treated in hospital.

Inspector visited bed and convalescent patients, inspected premises, instructed families through interpreters, how to take care of closets and prevent infection.

Results—It was promised that closets would be flyproofed and that lime would be used in them. The mode of infection for the eight cases investigated is chiefly, if not exclusively, through flies from open closets.

Inspector left Minneapolis 11:45 p. m., August 30, 1911, arrived in Ely 12:30 p. m., August 31, 1911. Left Ely 7:20 a. m., and arrived in Minneapolis 7:00 p. m., September 1, 1911.

REPORT.

To the Director, Division of Epidemiology, Minnesota State Board of Health.

Dear Sir: In obedience to your orders re collection of data on typhoid fever, etc., in Becker and Santiago townships, Sherburne county, I left Minneapolis 8:50 a. m., Northern Pacific Railway, and arrived in Becker 10:23 a. m. Left Becker at 4:18 p. m. and arrived in Minneapolis 6:00 p. m., April 5, 1911.

I have the honor to submit a report on the data secured.

Respectfully,
A. J. CHESLEY,
Epidemiologist.

Dr. Hill's report of Nov. 1, 1910, covers the epidemiology of this typhoid outbreak. My duty was to secure the economic data of the epidemic; to collect blood and feces from the E. family for laboratory examination in order to discover typhoid carriers who might infect dairy products if permitted to handle them.

Dr. E. W. Young, H. O. Becker Tp., Mr. A., Miss H., (trained nurse) and various members of the Carl E. family were interviewed. Mr. A. stated his expenses due to the typhoid of Mrs. A., age 37, Willie, age 12, Joy, age 8, all contact infections from Ellen, age 15, who was taken sick Oct. 2, 1910, as follows:

Physician (Dr. E. W. Y.)	$55.00	
Physician (Dr. H. T. S.)	90.00	
Nurse, six and one-half weeks	157.00	and board
Extra hired help	85.00	and board
Dairy products unsold	10.00	
Supplies for sick room (excluding drugs)	20.00	
	$447.00	

Mr. Carl E. was not at home. Other members of the household gave the items of expense incurred through typhoid fever in his family. Hattie, age 10, was taken sick Sept. 25, 1910 and died Oct. 22, 1910. She had a nurse for two weeks.

Carl E., age 30, was taken to Princeton hospital with typhoid fever on Oct. 23, 1910, remaining there nine weeks.

Mrs. M. D., age 70 (mother of Mrs. C. E.) went to the same hospital, Oct. 29, 1910, with typhoid fever and remained there seven weeks. After their return home, Christine D. age 33, was taken to the hospital Feb. 4, 1911, with typhoid fever. She remained in the hospital six weeks. Mrs. Carl E. age 36, Walter, age 7, Marie age 3, and Melvin age 2, were taken down the same day, Feb. 4, 1911, but were cared for by the trained nurse, Miss H. at home. All have normal temperatures now. Mr. Carl E. has "inflammatory rheumatism," which his physician thought to be a sequel of typhoid fever and is unable to do farm work. Mrs. E., in a fit of despondency, tried to commit suicide by cutting her throat with a piece of broken glass. The others are weak and anemic but are gaining in strength.

The expense of typhoid fever in this family to date is as follows:

Nurse for Hattie (two weeks)	$50.00	and board
Funeral expenses (estimate)	75.00	
Hospital and physician, Carl E., nine weeks	225.00	
Hospital and physician, Mrs. M. D., seven weeks	175.00	
Hospital and physician, Christine D., six weeks	180.00	
Nurse for wife and children, eight weeks	200.00	and board
Physician for wife and children, thirty-four visits at $9.00	306.00	
Medicines and disinfectants (to March 20, 1911)	45.00	
Sheets, sick bed articles	20.00	
Clarence E., extra help, six months	120.00	and board
Mildred E., extra help, three months	30.00	and board
Mrs. G., extra help, one week	2.00	and board
Dairy product unsold; creamery (cream from nine cows) checks average $55.00 per month, six and one-half months	357.50	
Total	$1,485.50	

Note that no estimate is made of the loss of time of adults or of the "value" of the child's life.

The expense of Rev. Benedict E.'s sickness and death, and the sickness of his wife and son Enoch, age 9, secondary infections, was given by Dr. Young as

Physician	$145.00	
Nurse	132.00	and board
Funeral expense (estimate)	75.00	
Extra help (estimate)	50.00	and board
	$402.00	

Santiago Tp., has paid Dr. E. W. Young, within a year for anti-toxin and treatment of diphtheria cases, two bills.

First	$230.00	in fall of 1910
Second	379.00	acted upon April 3, 1911
	$609.00	

Dr. Young believes that most of these cases might have been prevented as well as one death from diphtheria, by proper management at the start of the disease. Some of the local authorities objected to doing anything which would bring expense on the town.

SUMMARY.

Typhoid Fever, Becker and Santiago Townships, Sherburne County, April 3, 1911.

BY A. J. CHESLEY.

Request of Dr. E. W. Young, health officer.

Reason—Carl E. family convalescent from six months' siege of typhoid, wished to sell dairy products.

History—Sale of dairy products forbidden by State Board of Health in families with typhoid. These cases were infected by contact on account of mismanagement.

Inspector with Dr. Young interviewed members of the A. and E. families and collected specimens for laboratory examinations.

Results—Facts noted about preventable diseases:
Typhoid account, two deaths, $2,400.00 expense.
Diphtheria account, one death, $600.00 expense.
To prevent same, isolation hospital; full time trained health officer.

Inspector left Minneapolis 8:50 a. m., and returned 6:00 p. m., April 3, 1911.

EPIDEMIOLOGICAL INVESTIGATION OF DYSENTERY AT WELLS AND VICINITY, FARIBAULT COUNTY.

August 8-12, 1911.

By H. W. Hill, M. D., D. P. H.

This outbreak was clinically, in marked cases, as follows:

A well child suffers from diarrhea coming on suddenly and usually regarded by the parents as a passing attack due to dietary indiscretions. A day or two later blood appears in the frequent stools, later pus and mucus, these three (with water) forming thereafter the chief constituents. Loss of appetite, belly pains, rapid emaciation or rather dehydration, tenesmus. sometimes convulsions, but rarely delirium or tympanitis, and temperatures not above 101 degrees F. characterize the further progress. The urine is scant and high colored on account of the dehydration. Recovery is very slow, the symptoms showing a certain irregular intermittency and returning in full severity on the slightest indiscretion. Death may occur from toxaemia or inanition.

This corresponds, so far as it goes, with a classical description of Shiga dysentery. Persons of all ages were affected, the very young and very old suffering most severely. Nine deaths were attributed to it at the time of my visit. Great numbers of mild cases accompanied the severe ones, many people applying for treatment at physicians' offices or even relying on home treatment, in addition to those who were frank bed cases.

In many instances clear cut contact infection could be traced. Often the family history showed that the father or some other adult member. much away from home, was the first to suffer, his attack being comparatively mild. Flies, open toilets and absence of hand disinfection existed throughout Wells and vicinity and were doubtless the most constantly operative factors.

The earliest recorded cases occurred about July 10th, but in all probability cases not on record occurred even earlier. The origin of the outbreak is, therefore, left in doubt, a personal canvass of the whole population promising the only approximately sure method of securing a chance to find the original introducer of the disease.

The spread of the disease after its introduction is outlined in the circular of information, herewith quoted, which was issued in Wells, Aug. 11, 1911.

INFORMATION CONCERNING DYSENTERY IN WELLS AND VICINITY.

The outbreak in Wells and vicinity is a **severe type of dysentery.** This is a form which has proved to be very transmissible, the germs being found in the discharge from the bowels.

These discharges, **carried by flies** to fruit, milk, sugar, bread, cake, etc., on the table, from open outdoor toilets, or discharges which are exposed to flies, may spread from house to house. Sometimes following horses or wagons, flies will travel considerable distances.

Within families, especially where mild cases exist, the disease germs are often carried unconsciously in minute quantities of the discharges upon the hands, infected in handling the discharges of patients sick in bed, or during visits of the owner of the hands themselves to the toilet. Once on hands they may be easily transferred to the hands of others, to spoons, cups, milk or food at the table, or in the milking of cows, handling of butter, etc. In these ways the germs are distributed throughout the community.

The more dangerous persons are those who have the disease mildly, for these persons, although they convey the germs just the same as the very sick persons, yet are not confined to their homes as the sick ones are, but go to business, use toilets at different points and so leave the germs at many places where flies can get them and spread the disease.

The water, milk and other supplies of those affected with the disease have been investigated with considerable care.

The more to be avoided of these sources have been found to be raw foods of any description, handled by unknown persons, perhaps suffering from the disease; raw milk exposed to flies; cake, bread, etc.; in fact, anything which is not cooked and then eaten hot before flies can reach it.

The precautions to take are:

First—Always wash with soap and water your hands before putting fingers into the mouth for any purpose whatever, and before eating your own food.

Second—Always wash your hands thoroughly after using a toilet for any purpose.

Third—Always wash the hands thoroughly before serving or touching food intended for others.

Fourth—In preparing meals for others be sure the hands are clean first.

Fifth—If nursing a sick person, wash the hands thoroughly after touching the sick or anything connected with them, especially the discharges.

Sixth—The discharges should be received in receptacles containing milk of lime, saturated solution, or chloride of lime, 5 per cent. Use about the same amount of the solution as there is of the discharges. Diapers should go into 5 per cent of carbolic solution as soon as dirty.

Seventh—The discharges mixed with the solution should be thrown into a sewer if available. If they must be put into an outdoor toilet, be sure the discharges and the solution are well mixed and left standing together for fifteen minutes before they are thrown into the vault.

Eighth—Lime all toilets thoroughly in which any discharge from mild, severe or convalescent cases have been thrown heretofore. To do this properly at least enough unslaked lime should be put in to form a layer three inches deep over the whole surface of the discharges. Flies will visit any exposed discharges if they can.

Ninth—Soiled sheets, diapers, towels used by patients should be boiled AT ONCE (not left for the flies to get at), or placed in 5 per cent carbolic acid for an hour and then thoroughly washed.

Tenth—The patient's own hands should be washed frequently, as well as the patient's body.

Eleventh—Every open toilet should be made fly-proof. Every opening of any kind between the vault and the outside should be closed, except the seat. The cover of the seat should be hinged and so fixed by means of a spring, weight or otherwise that it will not stay open except when it is held up.

Twelfth—Garbage, and especially manure, breeds flies. Garbage should be burned and manure removed or covered to prevent flies breeding in it.

Thirteenth—Kitchens and dining rooms should be screened, both windows and doors, and plenty of fly paper should be used also.

Fourteenth—Do not let open sugar bowls or bread, cake, etc., remain exposed between meals or even during meals, unless all flies are entirely excluded.

Fifteenth—Boil or pasteurize all milk used from whatever source and use it hot. Don't take any risks with milk, even when you feel sure that you know all about its source. Infection creeps into it very easily.

Sixteenth—Deep well water is as a rule free from danger, but drinking water should not be allowed to stand in open pails, nor should those who wish to drink, dip the water out with a cup or dipper.

Seventeenth—Parents must take all these precautions for their children, because the children will not be careful for themselves as a rule.

Eighteenth—Remember the dangers are from

FOOD:
COOK THE FOOD.
FLIES:
SWAT THE FLIES.
FINGERS:
WASH THE FINGERS.

Nineteenth—THIS EPIDEMIC MUST BE STAMPED OUT BEFORE THE SCHOOLS OPEN. EVERYBODY SHOULD GET BUSY NOW.

W. H. BARR, M. D., Mayor.
M. MIKKELSON, M. D., Health Officer.
P. F. HOLM, M. D.
AGNES DOTY, M. D.

Endorsed by Minnesota State Board of Health, per Dr. H. W. Hill.
Dated August 11, 1911.

A possible source of spread, further investigation of which from a laboratory standpoint was arranged for at a conference August 22, 1911, held in the St. Paul office of the State Board of Health, between Dr. Bracken and the Director of the Laboratory Division and of the Epidemiological Division, is as follows:

The majority of the farmers surrounding Wells separate their own cream, take it to the Wells Creamery in Wells or to the Walnut Lake Creamery in Walnut Lake Township, and receive back in part payment, butter made from the mixed cream, i. e., the cream derived from all the contributors. Both creameries ship their butter to Eastern points; the Wells Creamery, however, supplies butter to Wells itself in amounts which, calculated at the creamery, would indicate that nearly half the population of Wells is so supplied. In either instance is the creamery butter the product of pasteurized cream.

It is not difficult to see that the introduction of infection into the cream of only one contributor to a creamery of this kind might easily result in the infection of the butter in use by a large number of neighbors, or in the case of the Wells Creamery, of a large proportion of the Wells population. The only apparent protection against the transmission of pathogenic bacteria in this manner is a hypothetical one, dependent on the possible destruction or devitalization of the bacteria during the processes of butter making or in the subsequent transit and storage of the butter.

The prevalence of this outbreak suggests the possible need of some form of medical supervision for the school children during the first week or so of school during the coming winter session. This was suggested in an article written for the "Forum—Advocate" of Wells, August 14, 1911.

DIPHTHERIA.

The control of diphtheria in institutions where the population is resident, and in schools, depends upon the separation of all infected individuals from the non-infected. While the isolation of the clinical cases removes the greatest part of the danger, the disease cannot be eliminated unless the well "carriers" are recognized and placed under adequate supervision. The expense and trouble consequent to the suppression of the disease depend largely upon the time when the culture method is adopted. If it is promptly applied and common sense of the epidemiological type is used in the control as well as in the investigation of the epidemic, the trouble and expense will be minimized. If there is delay before the culture method is adopted, the infection will be spread to a large number of those exposed, and the elmination of the disease will require more time, involve more persons, and cause much trouble and expense.

Although the reports of the Laboratory Division, as well as of this Division, show many epidemics controlled by the culture method, it seems worth while to compare two recent epidemics to show that satisfactory results depend on prompt application of this method. The local authorities who delay must blame only themselves for the results. The histories of these two epidemics previous to the institution of the culture method for control by the Division of Epidemiology are given in the following summaries:

SUMMARY.

Diphtheria, State Hospital for Insane, St. Peter City, Nicollet County, May 8, 1912.

BY A. J. CHESLEY.

By order of Executive Officer, State Board of Health.

Reason—Sophie J———, nurse, St. Peter Hospital, came home to Echo, April 11, having had sore throat since April 4. Cultures taken April 19 by Dr. John Gill, health officer, Echo, showed diphtheria bacilli in Sophie, 22, Mildred, 6, Eleanor, 13. These had clinical diphtheria, dates of first symptoms being April 4, 16 and 17, respectively. Mildred died April 25. The health officer suspected that Sophie brought the infection from St. Peter Hospital.

History given by superintendent St. Peter Hospital, Dr. H. A. Tomlinson, was as follows: There had been an epidemic of sore throat amongst nurses. Sick report showed sore throat as follows: April 18, Ida D———; May 2, Esther B———; May 6, Hilma W———; May 8, Elsie S———, nurses. Patient Kate B——— had sore throat May 6 (died later from an unrelated cause). Cultures examined by an interne were reported negative for diphtheria bacilli as follows: March 15, Annie J———; April 6, Martha S———; April 20, Ida

A——; Marie P; April 28, Lena H——; April 30, Edna B——; May 4, Eliz. M—— and Martha J——. No cultures had been sent to State Board Laboratory. No cultures were taken from Sophie J——. Her roommate, Lena H——, had gone home to Wood Lake, Minn. The others were still at the hospital.

Inspector discussed the probability of infection amongst the 540 patients and 60 employees who had come in contact with those who had sore throats. If these sore throats were due to diphtheria bacilli, clinical cases and many infected persons ought to be present in the hospital. Inspector took cultures from certain persons, whose throats were, or had been, sore, examined with Dr. Freeman, three night nurses, Bertha M——, Clara H—— and Elizabeth M——, reported sick, and found that they had clinical diphtheria. Took cultures and outlined management of the situation with Drs. Tomlinson and Freeman. Wrote Dr. W. J. Moore, health officer, Wood Lake, asking him to take cultures from the family of Lena H——.

Results Cases of clinical diphtheria and suspicious sore throat were found in the hospital. The management of the epidemic was referred to the hospital authorities with the approval of the executive officer. Cultures taken May 12 from Lena and Lizzie H—— showed diphtheria bacilli. (See appended reports and tables for details of epidemic.)

Inspector left Rochester 3:50 p. m., May 7, arrived St. Peter 8 p. m. Left St. Peter 12:15, arrived Rochester 3:50 p. m., May 8, 1912.

SUMMARY OF LABORATORY RESULTS AT STATE HOSPITAL FOR INSANE, ST. PETER.

Cultures Reported 1912	Total Persons Examined	New Persons Examined	New Persons Quarantined	Released on Second Negative
May 9	11	11	6	0
10	119	106	33	0
13	491	386	134	0
14	377	356	51	0
15	348	347	37	0
16	5	4	1	0
17	72	20	2	0
18	31	26	5	0
20	1	0	0	0
21	119	6	4	0
24	238	3	3	30
28	10	0	0	1
29	211	0	0	48
31	162	0	0	36
June 4	33	0	0	8
5	100	1	0	32
7	92	0	0	16
12	80	0	0	20
15	61	0	0	8
19	52	0	0	11
22	46	0	0	5
26	40	0	0	5
29	36	0	0	4
July 3	31	0	0	11
6	19	0	0	7
10	12	0	0	1
13	11	0	0	2
17	9	0	0	1
20	8	0	0	0
24	8	0	0	0
31	5	0	0	0
Aug. 3	5	0	0	0
7	5	0	0	0
10	5	0	0	0
14	5	0	0	0
17	5	0	0	0
21	5	0	0	0
24	5	0	0	0
29	5	0	0	0
31	5	0	0	0
Sept. 4	6	0	0	2
7	4	0	0	0
11	4	0	0	0
14	4	0	0	2
18	3	0	0	1
21	2	0	0	1
25	1	0	0	1

Culture method for control applied first on May 8th. The first sore throats began about March 15th. The delay in discovering and isolating infected persons accounts for the large number infected.

In comparing this epidemic with the one at the Dept. of Agriculture farm school (see next page) remarks seem superfluous. The figures speak for themselves. Had the delay been half as long at the school as at the hospital a very serious epidemic would have occurred. The students associated freely everywhere, while association between hospital inmates was curtailed by the strict discipline of the institution; the chief danger there being contact with infected nurses and other employes. The school epidemic involved 12 infected persons; of these, 11 were clinical cases, and one died. The hospital epidemic involved 282 infected persons; of these 15* were clinical cases, and one died.

(*15, including 3 at Echo, were reported as clinical cases, but it is probable that some unrecognized mild, clinical cases occurred earlier.)

SUMMARY.

Diphtheria, Department of Agriculture, University of Minnesota, Rose Township, Ramsey County, November 13-24, 1911.

BY A. J. CHESLEY.

Request of Dr. M. H. Reynolds, health officer.

Reason—Three students developed diphtheria and one died.

History—O. M. W———, 24, senior, School of Agriculture, 25 Pendergast Hall, was isolated for sore throat November 2; positive culture, November 3; died November 6, p. m. J. P. D———, freshman, School of Agriculture, Raymond avenue, St. Paul, sore throat and positive culture November 9, was taken to City and County Hospital, St. Paul. C. J. H———, 17, freshman, School of Agriculture, Alden avenue, sore throat and positive culture, November 10; broke quarantine, went home to Bloomington township, Hennepin county, and was quarantined there. These cases could not be traced to the first case. After a conference with the deans of the Departments of Agriculture and Medicine, President Vincent advised Dr. Reynolds to ask Dr. Bracken for assistance.

Inspector took cultures on November 13 of 242 freshmen of School of Agriculture, kitchen and dining room help, nurses, milkers, and others exposed to known cases or having sore throats. Cultures were taken of 91 persons November 14; 68 November 15; 48 November 16; 46 November 17; 22 November 18; 22 November 19; 21 November 20; 84 November 21 (including buttermaking class of 59 beginning work November 23, all negative); 22 November 22; 14 November 23; 8 November 24; 8 November 25; 8 November 26; 5 November 27; 3 November 28.

Results—Of 242 persons examined November 14, 5 girls, 15 boys showed diphtheria bacilli, 12 being dormitory students. All "positives" were quarantined and released after two consecutive negatives (separate nose and throat) for isolation in rooms until third negatives gave final release. All "reserves" were isolated until positive or released on negatives. Clinical cases were taken to City and County Hospital, St. Paul, on 11th, 2; 12th, 1; 13th, 1; 15th, 1; 16th, 1; 18th, 1. November 29 all positive and suspicious cases had been released except a well carrier, who was transferred to the "Contagious Pavilion, University Hospital," and released December 20. Of 408 persons, 42 were "positive," including 11 clinical cases, one resulting fatally. Although a serious epidemic was prevented and the school cleared up in 16 days through prompt application of the culture method and the efficient co-operation of the university authorities, this epidemic shows the university's need of medical supervision and adequate hospital facilities.

Inspector spent from two to five hours per day at the school on November 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 1911.

DEPARTMENT OF AGRICULTURE UNIVERSITY OF MINNESOTA.

Summary of Laboratory results given to illustrate the practical application of State Board of Health Regulations No. 27

(See page 32, Minnesota State Health Laws and Regulations, Aug. 1, 1911.)

Cultures Reported Nov., 1911	Total Persons Examined	New Persons Examined	New Persons Quarantined	Released on Third Negative	
Nov. 4	1	1	1	(Died Nov. 6)	**Culture method for control applied early,** only 10 days intervening between the appearance of the first sore throat and the general culutre taking.
5	1	1	0	....	
8	4	2	0	....	
8	3	1	0	....	
10	2	2	1	....	
11	2	1	0	....	
12	8	5	2	....	
13	5	3	2*	....	*One sent to hospital had no culture.
....	....	....	....	....	*State Board took charge.
14	242	238	24	....	
15	91	32	4	....	
16	68	21	1	....	
17	48	16	3	....	
18	46	8	1	8	
19	22	3	0	1	
20	22	3	0	3	
21	21	2	0	1	
22	84	59*	1	4	*57 persons not tested before were about to begin buttermaking and therefore were tested. All were free from diphtheria bacilli. This indicates that the group previously selected for cultures was sufficient to include those who really had been exposed at school.
23	12	0	0	3	
24	14	6	1	2	
25	8	0	0	1	
26	8	1	1	1	
27	8	1	0	2	
28	5	2	0	0	
29	3	0	0	2	

AN OUTLINE OF THE METHOD USED IN TAKING CULTURES IN SCHOOLS AND INSTITUTIONS.

When it is advisable, because of exposure to infection in schools or institutions, that cultures be taken to determine how many individuals are carriers of diphtheria bacilli, the local health officer and the head of the school or institution are communicated with by telephone or letter and arrangements made for the taking of mass cultures.

The epidemiologist obtains culture material, etc., from the laboratory division and inspects same before leaving the laboratory.

SUPPLIES.

Serum—Tubes in square wire baskets, plain labels, not capped, plugs drawn out one-half inch.
Allow 20 per cent extra serum tubes for first 100 persons to be examined; 10 per cent for each 100 after the first 100, i. e.:
100 persons, 120 serums.
200 persons, 230 serums.
300 persons, 340 serums.
Swabs—(Cotton tipped, wooden applicators, wrapped in paper and then sterilized) bunches of 50, handle end marked "Open this end."
Allow 3 bunches of swabs (150) for 50 persons.
Allow 4 bunches of swabs (200) for 75 persons.
Allow 5 bunches of swabs (250) for 100 persons.
Allow 7 bunches of swobs (350) for 150 persons.
Two empty glass tumblers.
Wooden tongue depressors.
Small rubber bands.
Large rubber bands.
Small forceps for pulling plugs.
Pencils, lead and glass.
Extra labels.
Small towels, soap.
Small electric flashlight.
Squares of wrapping paper (20 inches square).
24-inch lengths of heavy string (one of each for every 35 tubes).
Old newspapers (folded and used as packing between baskets in suit case).
Special data cards (allow 125 for 100 persons to be examined).

Mass Cultures for Diagnosis: In taking mass cultures for diagnosis, combined nose and throat cultures, i. e., both swabs sown on one tube of serum, are used.

Special Data Cards: At the school, the epidemiologist assembles the teachers in the principal's office, gives each one a special data card and outlines on the blackboard the data to be entered on the cards. Each teacher prepares her own card. Cards are then inspected, questions answered in regard to them and instructions given the teachers about preparation of cards for absentees and the management of their pupils during the culture taking.

Data Required: The data required are: Full name of each individual, age, sex, room and grade, name of school, initials of parent or name of guardian, and residence by township, village or city (not postoffice address). For pupils who are non-residents of the sanitary district in which the school building is located, the township, village or city in which they live must be given. It they board away from home while attending school, the name and address of the family with whom they board should be given and it should be noted whether the pupil goes home every night, at week-end, or at vacation only.

Teachers' Duties: The teachers distribute the cards to their pupils, illustrate on the blackboard how the cards should be filled out and inspect the cards after they have been filled out by the pupils to see if the data have been correctly entered.

Preparation for Culture Taking: The epidemiologist proceeds to one of the rooms. A package of swabs is torn open and in its sterile wrapping set in one of the tumblers. A basket of serum is set beside the tumbler containing the swabs on the window sill. A box of tongue depressors and the electric flashlight is laid beside the swabs. An old newspaper is opened up and put on a chair or the floor to the right of the window.

Culture Taking: The pupils then take their cards, form in single file and march to the window. Pupil faces the window, opens his mouth and says "ah." The inspector takes a tube of serum in his left hand, holding it between the index and middle fingers with the end resting in the palm. Two swabs are picked up, one placed between the middle and ring finger in the left hand. The other held between the thumb and forefinger of the right hand is used to swab the pupil's throat. Having thoroughly swabbed the throat, the plug of the serum tube is grasped between the little finger and palm of the right hand, withdrawn, the throat swab is rubbed firmly with a rotary motion over the serum, withdrawn from the tube, the plug returned to the tube and the swab put on the old newspaper.

The second swab is then taken in the right hand, the end inserted about one-half inch upward into the naris, and raised so the shaft of the swab becomes parallel to the floor of the naris and with gentle rotation the swab is passed back to the posterior pharyngeal wall, withdrawn and the process repeated in the other naris. Then the serum is inoculated with this swab and the swab discarded, the serum tube plugged and handed to the pupil. Each pupil takes his tube and his card directly to the teacher who gives them serial numbers, the tube and the card of each pupil receiving the same number.

Packing of Cultures: The cultures of the room are then bunched with a large rubber hand and wrapped in one of the squares of wrapping paper, tied with the heavy string, the name of the school and number of the room marked on the package. The cards are bunched with a small rubber band and inserted under the string of the package, which is put into the Inspector's suit-case.

For an average room, 35 to 40 pupils, 10 or 15 minutes are required to complete the culture taking.

Absentees: The cards of absentees are given with sufficient culture materials to the local health officer or school doctor, who will visit the families and take the cultures at home or will have the teachers refer pupils to him for cultures when they return to school.

Subsequent Cultures: In taking subsequent cultures from those whose combined cultures were positive, suspicious or unsatisfactory, separate nose and throat cultures, similar to the diagnosis cultures for clinical cases and for the release of quarantine of all cases, are used.

LIST OF INVESTIGATIONS.

DIPHTHERIA.

Twenty-four epidemiological investigations of diphtheria were made during the biennial period Aug. 1, 1910, to Aug. 1, 1912, in seventeen counties. The field work required fifty-five days. No reports or summaries for investigations made between Aug. 1, 1910 and Jan. 1, 1911 are included since the work was covered in the first report of this division.

County.	Township, Village, City.	Date.
Carlton (M)	Wrenshall township	Oct. 30-Nov. 1, '10
Douglas (C)	Leaf Valley township Ida township	July 30-Aug. 1, '12
Faribault (C)	Winnebago village	October 2-3, 1911
Goodhue (C)	Minneola township Zumbrota village	Sept. 25-26, 1911
(C)	Minneola township	Jan. 29-30, 1912
Lake (C)	Two Harbors city	Nov. 22-23, 1910
McLeod (C)	Glencoe city	May 30, 1911
Nicollet (C)	St. Peter city, State Hospital for Insane	May 8, 1912
Nobles (C)	Worthington city	Nov. 13-15, 1910
(C)	Ellsworth village	October 4-6, 1911
Polk (C)	Johnson township	July 19-21, 1911
Ramsey (C)	Rose township, Department of Agriculture, University of Minnesota (11 trips)	Nov. 13-14, 1911
(C)	Rose township, Department of Agriculture, University of Minnesota	December 21, 1911
Renville (C)	Cairo township	March 14-15, 1911
(C)	Cairo township	April 11-12, 1911
(C)	Cairo township Fairfax village	April 27-28, 1911
St. Louis (C)	Duluth city	Dec. 12-14, 1910
Scott (H)	Belle Plaine borough	Dec. 19-20, 1911
(C)	*Shakopee city	**January 3, 1912
Sherburne (C)	Santiago township	February 1-2, 1911
Stevens (C)	Morris city	Dec. 11-12, 1911
(C)	Morris city	Dec. 14-15, 1911
Wabasha (C)	Plainview village	December 2-4, 1911
Winona (C)	Hillsdale township Winona township	February 16, 1912

C=Dr. A. J. Chesley. H=Dr. H. W. Hill. M=Dr. S. W. McEwan.
*Another communicable disease investigated at same time.
**Dates appear in two different places, but days are counted but once.

SUMMARY.

Diphtheria, Leaf Valley and Ida Townships, Douglas County, July 30 and 31, 1912.

BY DRS. A. J. CHESLEY AND GEO. A. GEIST.

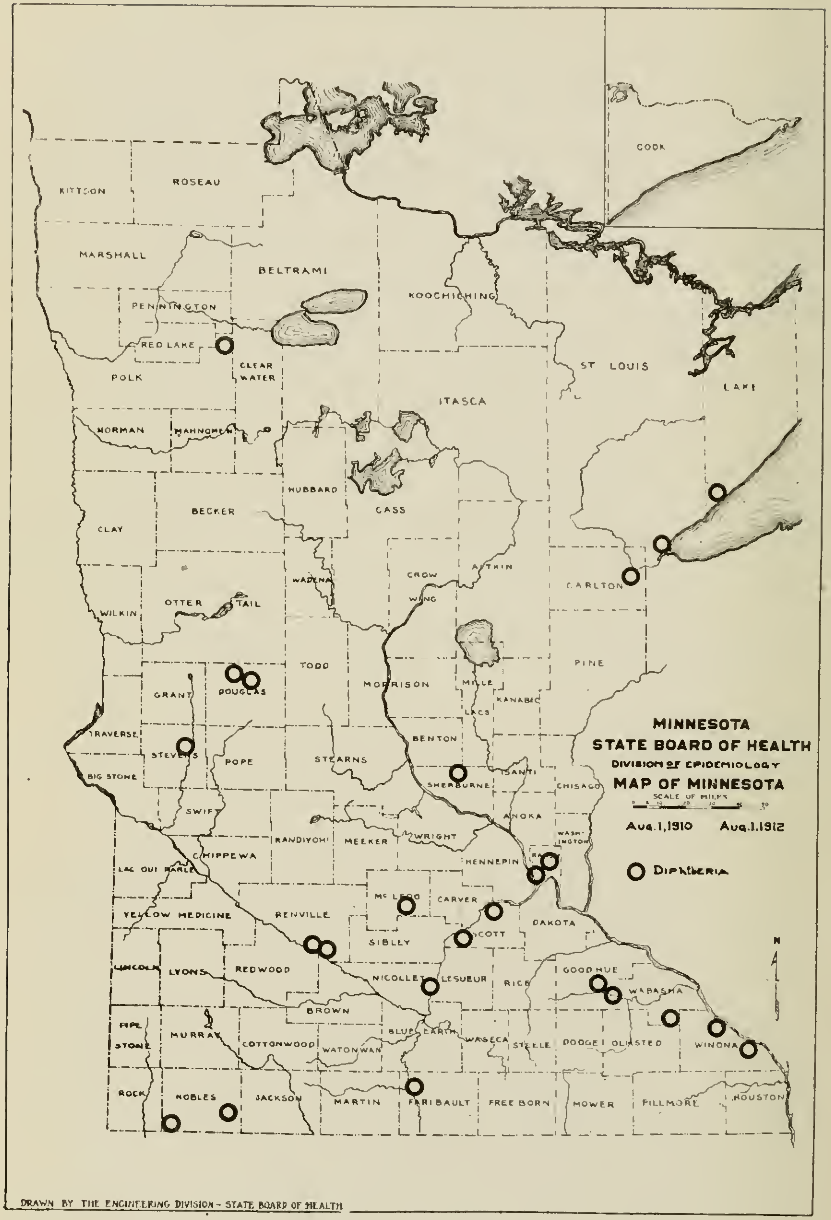
Request of Dr. C. A. Lester, Alexandria, Minn.

Reason—Many persons were sick with sore throats; three had died.

History—Dr. C. A. Lester said there were many "sporadic" sore throats during the winter in Leaf Valley, Ida, La Grand and Moe townships, and had treated them as quinsy and tonsilitis, neither taking cultures nor using antitoxin. He prescribed for Herman S.'s sore throat in December; examined him in January, finding albuminuria, cyanosis, aphonia, aphagia, paresis of legs, ailed six weeks; many visitors, no quarantine. Henry S., 70, died in March from the "same sickness." Dr. Lester treated the John K.—— and S.—— families. Dr. L. M. Keene, Alexandria, saw W. B—— f, 50, June 17, sick seven days, diagnosis diphtheria; reported to health officer, culture "negative." *Dr. A. D. Haskell, Alexandria, saw Mary V.—— f, 7, June 21; sick two days and diagnosis diphtheria. Report to health officer, gave antitoxin. Culture reported "reserved."* Members of H. W. V.—— family got sick and exposed public at (1) fire sale, general merchandise; (2) church picnic July 4. Emma V.—— f, 20, sick at store, went home (Wm. V.'s). Dr. H. H. Leibold, Parkers Prairie, saw her, diagnosis diphtheria, reported to health officer, antitoxin given, culture report "negative."* Dr. Lester treated (a) Rev. J. K.'s family for quinsy; two died, no cultures.*; public funeral July 25th; (b) J. J.'s family (11), one died July 28th, private funeral at church, quarantined July 30th; (c) Emil B.'s girl, 15, "positive" culture, antitoxin given, quarantined July 30th.

Inspectors with chairman board of supervisors Ida township, visited all directly exposed, taking forty-five cultures from seven families, and with chairman board of supervisors Leaf Valley township, took thirty-one cultures from six families. Visited creameries, Leaf Valley and Ida townships. Left regulation No. 10.

Results—Dr. Geo. W. Gray, Garfield, appointed health officer of Ida township; Dr. J. C. Drexler, Brandon, appointed health officer Leaf Valley township.



See List on Page 253.

Specific directions re management of the situation written to the health officers based upon laboratory reports. Chairman board of supervisors of La Grand and Moe townships given instructions, laws and regulations, etc.

Inspectors left Minneapolis 5:55 p. m., arrived Alexandria 9:40 p. m., July 30, 1912. Left Alexandria 3:20 a. m., arrived Minneapolis 7:30 a. m., August 1, 1912.

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*No quarantine. Health officers misunderstood regulation No. 25.

SUMMARY.

Diphtheria, Winnebago Village, Faribault County, October 3, 1911.

BY A. J. CHESLEY.

Request—Dr. M. D. Cooper, health officer.

Reason—Development of diphtheria amongst the school children.

History—No previous diphtheria case reported in school district which would account for the introduction of the infection amongst the school children. The children of nine families developed diphtheria within a period of two weeks.

Inspector conferred with the boards of health and education. With the assistance of the health officer, took nose and throat cultures of 396 pupils, teachers and others connected with the schools; recommended that the present supervision be continued; that more pressure be given the water in the school drinking fountains so that the lips would not be allowed to touch the fountain when drinking; that roller towels be replaced by some other form of individual towels, preferably paper; that articles of common use be cleansed daily with some disinfectant solution (door knobs, hand rails, desk tops, etc.); that scrubbing was preferable to any attempt of gaseous disinfection of the school building.

Results—The cultures of those present at school (396), reported by telephone from the laboratory, October 4th, show twenty-two individuals with "positive" types of diphtheria bacilli, and forty-three with "suspicious" types of diphtheria bacilli. All persons with "positives" will be quarantined until released on two consecutive negatives. All persons with "suspicious" will be isolated and released on one negative. No person will be admitted to school without cultural evidence of freedom from diphtheria like organisms. Cultures will be taken from absentees by Dr. Cooper. A card index of absentees and pupils was prepared to be used to check up the epidemic.

Inspector left Minneapolis 4:20 p. m., arrived in Winnebago 7:25 p. m., North-Western Railway, October 2, 1911. Left Winnebago 4:50 p. m., arrived in Minneapolis 11:45 p. m., October 3, 1911, Chicago, Milwaukee & St. Paul Railway.

SUMMARY.

Diphtheria, Cairo Township, Renville County, March 14-15, 1911.

BY A. J. CHESLEY.

Request of Mr. J. A. Whitmer, chairman board of supervisors.

Reason—Dr. Lee, health officer, absent; Dr. G. H. Walker, deputy health officer, sick with diphtheria; Dr. Crandall too busy to assume duties of health officer. Harvey K.———, six, died of laryngeal diphtheria, many families exposed at funeral and at school.

History—Chas. B.'s family had diphtheria in October, 1910. Disease spread to others. There were many sore throats this winter and no cultures taken. Many cases had no medical attention. Quarantine of B——— family was released without "negative cultures." Supervisors, acting on advice of physicians, quarantined on suspicion all families exposed to Harvey K.——— Some resented this action and chairman board of supervisors requested aid.

Inspector interviewed Drs. Walker and Crandall and others. Took cultures from families quarantined on suspicion and school teachers of schools No. 26, No. 32 and No. 39.

Results—Of the families quarantined on suspicion, certain members of five had "positive" cultures, the remaining fourteen families were free from diphtheria bacilli and the chairman board of supervisors was advised to remove quarantine cards. School disinfection and reopening of schools was provided for. Misunderstanding of supervisors and others re state board regulations and method for control of diphtheria was corrected.

Inspector left Minneapolis 8:30 a. m., March 14, 1911, reported for duty in Minneapolis 6:30 p. m., March 15, 1911.

SUMMARY.

Diphtheria, Cairo Township, Renville County, April 12, 1911.

BY A. J. CHESLEY.

Request of Mr. J. A. Whitmer, chairman board of supervisors.

Reason—Opposition to town board in continuing quarantine after patients had recovered from diphtheria but still had diphtheria bacilli in their throats.

History—See report of investigation by A. J. Chesley, March 14 and 15, for epidemiological data. No medical health officer had been appointed for Cairo township. The physicians had sent cultures from families in their care. The fact that most of the patients had fully recovered made the quarantine seem ridiculous and unnecessary. This attitude had been encouraged by remarks of one physician.

Inspector visited nine families, met their objections by stating the facts regarding prevention of diphtheria infection by quarantine. Released only upon "negative" cultures and gave people advice about the common drinking cups, towels, etc., sleeping of infected individuals with others, necessity for local throat treatment to eliminate diphtheria bacilli, etc.

Results—Information obtained **re** attitude of certain physician **re** breaking of quarantine by certain individuals and **re** losses by epidemic. Provision made for appointment of medical health officer in Cairo township.

Left Minneapolis 9:00 p. m., April 11, 1911, Minneapolis & St. Louis Railway, arrived Fairfax 12:30 a. m., April 12th. Left Fairfax 2:40 p. m., arrived Minneapolis 6:40 p. m., April 12, 1911.

SUMMARY.

Diphtheria, Morris City, Stevens County, December 11-12, 1911.

BY A. J. CHESLEY.

Request—Dr. Amos Leuty, health officer.

Reason—Several cases of diphtheria (two fatal) amongst parochial school children.

History—First case in high school four weeks ago. Only one followed this and younger children attended parochial school. One clinical case in quarantine now and one suspicious case in isolation. Basement rooms (parochial school) being poorly lighted and ventilated, favored spread of infection.

Inspector took nose and throat cultures at school. Health officer and Dr. Fitzgerald, medical supervisor for parochial school, assisted. Visited homes and took cultures from isolated suspect and clinical case.

Results—Father Ed. Jones agreed to co-operate with health officer. Dr. Fitzgerald has been employed to take cultures and inspect pupils. Cultures taken December 12 showed diphtheria bacilli, E. C.——— and J. S.———, room 3. Six were "reserved" because of spore bacilli, one, E. K.——, room 2, and J. K.———, G. and M. S.———, room 3, showed suspicious bacilli. Separate nose and throat cultures were requested from these individuals. Eighty-two pupils showed "negative" cultures. All "positives" will be quarantined and released on two consecutive "negatives." All "reserves" will be isolated and released on separate nose and throat "negatives.'

Inspector left Minneapolis 8:03 p. m., December 11th, arrived in Morris 1:10 a. m., December 11, 1911. Left Morris 11:25 a. m., arrived in Minneapolis 6:00 p. m., December 12, 1911.

SUMMARY.

Diphtheria, Morris City, Stevens County, December 14 and 15, 1911.

BY A. J. CHESLEY.

Request of Dr. Amos Leuty, health officer.

Reason—Parochial school "positives" and "reserves" of December 12th in families whose other children attended the public schools caused a demand for cultural examination of all school children.

History—See report of December 12th on Morris parochial school.

Inspector took 220 cultures at Longfellow school while health officer and Dr. Fitzgerald took 86 cultures at Lincoln school, and after inspector left they took 33 pupils, room 6, Longfellow school.

Result—Telephoned health officer December 17, 11:30 a. m., on cultures brought by inspector and examined December 16, and on cultures expressed by health officer and examined December 17th. Five "positives" in high school, one in second grade Lincoln school, one "reserve" (suspicious bacilli), eighth grade, and one first grade, Longfellow school. Diagnosis "reserved" on five others in Longfellow school on account of spore bacilli and no growth.

Inspector left Minneapolis 8:03 p. m., December 14th, arrived Morris 1:10 a. m., December 15th: Left Morris 11:23 a. m., arrived Minneapolis 6:00 p. m., December 15, 1911.

SUMMARY.

Diphtheria, Plainview Village, Wabasha County, December 2, 3, 4, 1911.

BY A. J. CHESLEY.

Request of Dr. H. H. Slocumb, health officer.

Reason—Diphtheria among school children.

History—About fifteen cases had occurred. School inspection and cultures indicated well carriers amongst school children. School was closed the week of November 27th. Health officer had planned to take cultures from school December 4th.

Inspector, with health officer, took cultures from 287 pupils, teachers, etc., and clinical cases; made arrangements to open parochial school on same conditions.

Results—Two teachers and six pupils were "positive"; four teachers and twenty-four pupils were "reserved"; (several due to incorrect labeling of tubes at school). Health officer will send cultures from absentees and will release "positives" on two "negatives" separate nose and throat, release "reserves" on one "negative," separate nose and throat. Rev. Drews parochial school will be treated similarly. School was closed December 5th, reports telephoned 5.00 p. m., December 5th.

Inspector left Albert Lea 1:25 p. m., via Owatonna, Eyota, arrived Plainview 11:00 p. m., December 2d. Left Plainview 1:30 p. m., via Eyota, Dodge Center, arrived Minneapolis 10:00 p. m., December 4th.

SCARLET FEVER.

Special attention is called to the complete reports of the work of this Division in the management of scarlet fever, etc., Rochester C., Olmsted county and Thief River Falls C., Pennington County. These reports have been given in full in order to explain the details of the routine of epidemiological work in scarlet fever. **The same methods apply in all diseases where clinical observation is the only practical means for the detection and supervision of infectious persons.**

It is interesting to note that at Rochester, in the midst of a very serious epidemic of scarlet fever, the local authorities were able to take charge of the situation and carry out the measures advocated by the Division of Epidemiology with the most satisfactory results. The work was done under Dr. Charles H. Mayo, city health officer, by the assistant health officer, Dr. B. F. McGrath, (chief of the department of experimental surgery of the Mayo clinic), who was detailed by Dr. Mayo to take charge of the work until a full-time health officer could be arranged for. Dr. Chesley assisted Dr. McGrath, as shown by the summaries, for several days in getting the work in hand. The system is well outlined in a report by Dr. McGrath made at a special meeting of the Commercial Club, May 14, 1912. Dr. Mayo was appointed health officer May 2.

REPORT OF SPECIAL MEETING OF COMMERCIAL CLUB, 8:00 P. M., MAY 14, 1912.

Mayo Office, Rochester, Minn.

BY DR. B. F. McGRATH, ASSISTANT HEALTH OFFICER.

Total number of scarlet fever cases from the beginning in April, 1912, to 6:00 p. m., May 14, 1912	105
Total number of cases of infectious diseases May 14, 1912:	
(a) Scarlet fever	83
(b) Diphtheria	2
(c) Smallpox	1
(d) Measles	9
(e) Chickenpox	7
(f) Mumps	1
Released from quarantine	21
Transferred (to Haverhill township)	1
Deaths (scarlet fever)	2

Health office force:
- (a) Dr. Chas. H. Mayo, health officer.
- (b) Dr. B. F. McGrath, assistant health officer.
- (c) Dr. Robt. M. Mussey, attending physician.
- (d) Miss Snyder, visiting nurse.
- (e) Miss Huselgard, typist.
- (f) Captain Thurber, inspector.

Special school physicians	10

Local physicians: Drs. Granger, Crewe, Mosse and Witherstine. Mayo staff: Drs. Fisher, Matthews, Logan, Wood and Lewis (with Substitute Archibald).

Four fumigators: Undertakers Macken, Paine, Lawler and Tollefson.

System of health office—(a) Card indexes covering all infectious diseases, suspected patients, milk routes, hôtel employes, fumigators, schools, etc.

(b) A pin map indicating locations of cases of scarlet fever, diphtheria and smallpox.

School inspection: To general inspections; special inspection of German school by Dr. Mosse, of Convent by Dr. Joyce. May 14, 1912, a special inspection of Central school, room under Miss Shaffer, by Dr. R. M. Mussey. Reason: A pupil presenting herself at health office was discovered to be in the active stage of scarlet fever. A general inspection ordered for May 15, 1912, and physicians notified. At these inspections every pupil is examined with regard to infectious diseases, the suspected are sent home and reported to the Board of Health. Every pupil absent from school must report at the health office, where he is examined, full data taken, and if O. K., is given a card readmitting him to school. If not O. K., he is sent home with instructions and observed according to the conditions presenting themselves at the examination. Where the slightest suspicion exists in the examiner's mind as to the safety of the pupil's condition, a decision is made on the side of safety.

Daily procedure at the health office: All reporting school children are examined by the assistant health officer, notes taken and cards written by visiting nurse and typist.

Every 'phone message and visitors' business are at once written on the daily record. These include complaints of all kinds, reports of suspected cases, physicians' reports, applications for holding of public, semi-public and semi-private events, advice, etc. No message is considered too trivial to be set aside and reasonable attention is given to all. All decisions are given according to the need of special care under the present conditions. All gatherings in inclosed places are discouraged, and the reasons pointed out plaintly to the applicants.

When a case of scarlet fever is reported it is at once segregated and all possible data concerning it acquired. This includes the names of exposed people, the degree of exposure, and their area of danger to the public. Suspects are grouped according to the probability of infection. Suspects who are directly exposed are observed in isolation for five or six days, examined, and if negative are allowed freedom. Supporting members of families, on application to be relieved from quarantine, are investigated as to the conditions of quarantine, and if the latter are satisfactory the applicant is given a permit of freedom restricted by the regulations and he in turn signs a declaration promising to live up to these regulations.

When the work of the earlier part of the day is under control, the assistant health officer visits quarantined patients who are dated for possible release, investigates suspects and responds to all other requests for seeing patients, etc. The attending physician and visiting nurse visit cases, seek for new information regarding people ill, and all write the results of their investigations on their return to the health office. When a patient is found O. K., one of the fumigators (sent in rotation) is notified, the amount of work to be done stated, and when the work is done the fumigator fills out a card which is filed at the health office.

In the evening the assistant health officer and attending physician remain on duty at the health office, the latter to answer calls, the former also to answer calls, straighten out the records of the day and plan the campaign for the morrow. All the daily notes which have been immediately taken are later typed for future reference in convenient form of the history of the present situation. All original notes are preserved.

The health department considers patients with mild symptoms, such as a sore throat, no physician, and going freely in our midst as a great source of danger in spreading infection. We welcome information with regard to such persons and all complaints which will enable us to investigate and exlude danger. It is not uncommon for physicians to incidentally discover peeling on patients who then give a history of a slight sore throat some days before. We emphasize the rigid enforcement of isolation of all suspected people. We consider such far more dangerous to public health than those patients whom we have safely confined in quarantine.

From our experience with the presnt conditions we are firmly convinced that a hospital for infectious diseases would be invaluable in the city of Rochester. In this, as in epidemics everywhere, cases arise which prove the value of such an institution. As an illustration of the value of immediate segregation of infectious diseases, the following may be cited: A few days ago the assistant health officer was called in consultation with a local physician. The family visited was composed of seven members, a mother and six children. The oldest child was found to have scarlet fever in the acute stage. This patient was immediately sent to the city infirmary and all other members of the family isolated. The conditions of this home were ideal for the transmission of infection. None had had scarlet fever, the family was rather poor, and the avoidance of intercommunication seemed improbable. After eight days of observation no other member of that family showed signs of scarlet fever.

Speakers at meeting: Dr. Chas. H. Mayo said that he would accept an appointment as health commissioner of Rochester if a suitable assistant would be secured. Such assistant would do the active work, his duties being to place the health department not only on a scientific basis but also on a business basis. Such a physician must devote his whole time to the work, must be fittingly remunerated and would have plenty to do even in the absence of such conditions as the present. Slaughter houses, butcher shops, milk, nuisances, etc., could be put in proper condition for public health and safety. Rochester is no longer to be considered a small town, but viewed as a large city because of its peculiar conditions. Figures show that we have between 800 and 1,000 transients in this city.

Dr. Mosse, and also Dr. Mayo, attacked the present system of charge for fumigations as unjust, and held that the city should be wholly responsible for them. Dr. Mosse furthermore argued strongly for a hospital for infectious diseases, and depicted the deplorable state of the city infirmary.

Dr. Crewe suggested placing the matter of fumigations under the police department, and therefore at the expense of the city.

Postmaster Crabb spoke strongly in favor of a hospital for infectious diseases and said that the postoffice business had been reduced one-half during the present situation.

Father O'Connor spoke for a strong influential commercial club which would properly bring the people's interests before the city council, and believed that the city council being correctly enlightened as to the people's wishes would be only too glad to favor recommendations.

Adjourned.

(Signed) B. F. McGRATH.

A daily letter was sent to all the local physicians and copies given the newspapers outlining the situation, so that everyone would know what was going on and how best to co-operate in order to get immediate results. A copy of one of these letters is quoted:

Rochester, Minn., May 13, 1912.

Dear Doctor: The following is the record of the health department of infectious diseases in the city; summary made at 6:00 p. m., May 12, 1912:

Number of locations	45
Number of cases:	
(a) Scarlet fever	89
(b) Diphtheria	2
(c) Measles	9
(d) Smallpox	1
(e) Chickenpox	5
(f) Mumps	1
Total number of report cards on file:	
(a) Scarlet fever	7
(b) Measles	4
(c) Smallpox	1
(d) Chickenpox	3

A comparison of the list of cases with the list of report cards clearly shows what is necessary with regard to the latter, if we hope to satisfy the State Board of Health. We sincerely appreciate your conscientious co-operation and assistance during the presnt conditions, and are confident that you will continue the good work. In order to still further improve the situation, we should be greatly gratified if now you give due attention to the official report cards. Please fill out and send to the health department a card for every new case of infectious disease, which comes under your observation, thereby helping us to make complete reports to the State Board.

Very sincerely yours,

(Signed) CHAS. H. MAYO.
Health Officer.

To those technically interested in epidemiological work, the complete reports mentioned and the outline of the system carried out by the Health Officer at Rochester will be interesting. The success of the work depends upon speed, accuracy and thoroughness. The **clinical cases** must immediately be recognized and isolated; **the source of infection** must be traced if possible; **the persons exposed** must be examined and kept under daily observation during a period exceeding by a safe margin the average incubation period of the disease concerned. The carrying out of this method is difficult, trying work, but good results are certain when the work is done in this manner.

A well trained Visiting Nurse is of great assistance since she can look up absentees and other suspects and determine whether they are free from symptoms or not, thus saving the medical inspector many useless trips otherwise unavoidable.

LIST OF INVESTIGATIONS.

SCARLET FEVER, GERMAN MEASLES, MEASLES.

Fifty-six epidemiological investigations of scarlet fever, German measles and measles were made during the biennial period Aug. 1, 1910 to Aug. 1, 1912 in twenty-four counties. The field work required one hundred nineteen days. No reports or summaries for investigations made between Aug. 1, 1910 and Jan. 1, 1911 are included since the work was covered in the first report of this Division.

SCARLET FEVER.

County.		Township, Village, City.	Date.
Anoka	(C)	Oak Grove township	March 9, 1911
	(C)	St. Francis village	
	(C)	St. Francis township	
	(C)	Oak Grove township	April 20, 1911
Becker	(C)	Detroit city	March 13-16, 1912
Brown	(C)	Evan village	March 28-30, 1912
	(C)	Prairieville township	
Carver	(C)	Waconia village	December 19, 1911
	(C)	Dahlgren township	February 15, 1912
Fillmore	(C)	Rushford village	Jan. 17-19, 1911
Goodhue	(C)	Zumbrota village	Dec. 27-28, 1910
Grant	(C)	Macsville township	Dec. 30, '10-Jan. 1, '11
Hennepin	(C)	Eden Prairie township	April 4, 1911
	(C)	*Eden Prairie township	April 17, 1911
	(C)	Richfield village	April 18, 1911
	(H)	Robbinsdale village	April 24, 1911
	(C)	Robbinsdale village	November 13, 1911
	(C)	Robbinsdale village	February 17, 1912
	(C)	Excelsior village	June 19, 1912
		Excelsior township	
Kandiyohi	(C)	Atwater village	May 22-24, 1911
		Genessee township	
		Lake Elizabeth township	
		Lake Lillian township	
Lac qui Parle	(H)	*Dawson village	December 9, 1911
Lincoln	(C)	Lake Benton village	April 29-May 1, '11
Lyon	(H)	*Tracy	August 29-31, 1910
Mille Lacs	(C)	*Borgholm township	March 6-7, 1911
Mower	(C)	Austin city	May 12-14, 1911
Olmsted	(C)	*Rochester city	January 5-9, 1911
	(C)	Rochester city	Jan. 11-16, 1911
	(C)	Rochester city	Jan. 23-31, 1911
	(C)	Rochester city	Feb. 12-15, 1911
	(C)	Rochester city	Feb. 18-19, 1911
	(C)	Rochester city	September 26, 1911
	(C)	Rochester city	Apr. 23-May 1,' 12
	(C)	Rochester city	May 2-7, 1912
	(C)	Rochester city	May 9-11, 1912
Otter Tail	(C)	*Vergas village	Oct. 29-30, 1911
Pennington	(C)	Thief River Falls city	March 2-4, 1911
Rock	(C)	*Hills village	April 6-10, 1911
		Martin township	
St. Louis	(C)	Duluth city	June 2-4, 1911
Scott	(C)	Credit River township	January 8, 1912
Stearns	(C)	Freeport village	Jan. 9-10, 1912
	(C)	Sauk Center city	July 22-23, 1912
		Sauk Center township	
		Getty township	
Wilkin	(H)	*Campbell village	April 25-26, 1911
	(C)	McCauleyville township	May 15-17, 1911
		Mitchell township	
		Nordict township	
		Robert township	
		Kent village	
Winona	(C)	St. Charles city	Feb. 16-17, 1911
	(C)	Norton township	March 18-21, 1911
		Utica village	
		Utica township	
	(C)	*Elba village	April 13-14, 1911
		Elba township	
		Fairwater village	
Wright	(C)	Albertville township	Feb. 9-10, 1911

MEASLES.

Mille Lacs	(C)	*Borgholm township	March 6-7, 1911
Winona	(C)	*Elba village	**April 13-14, 1911
		Elba township	
		Fairwater village	

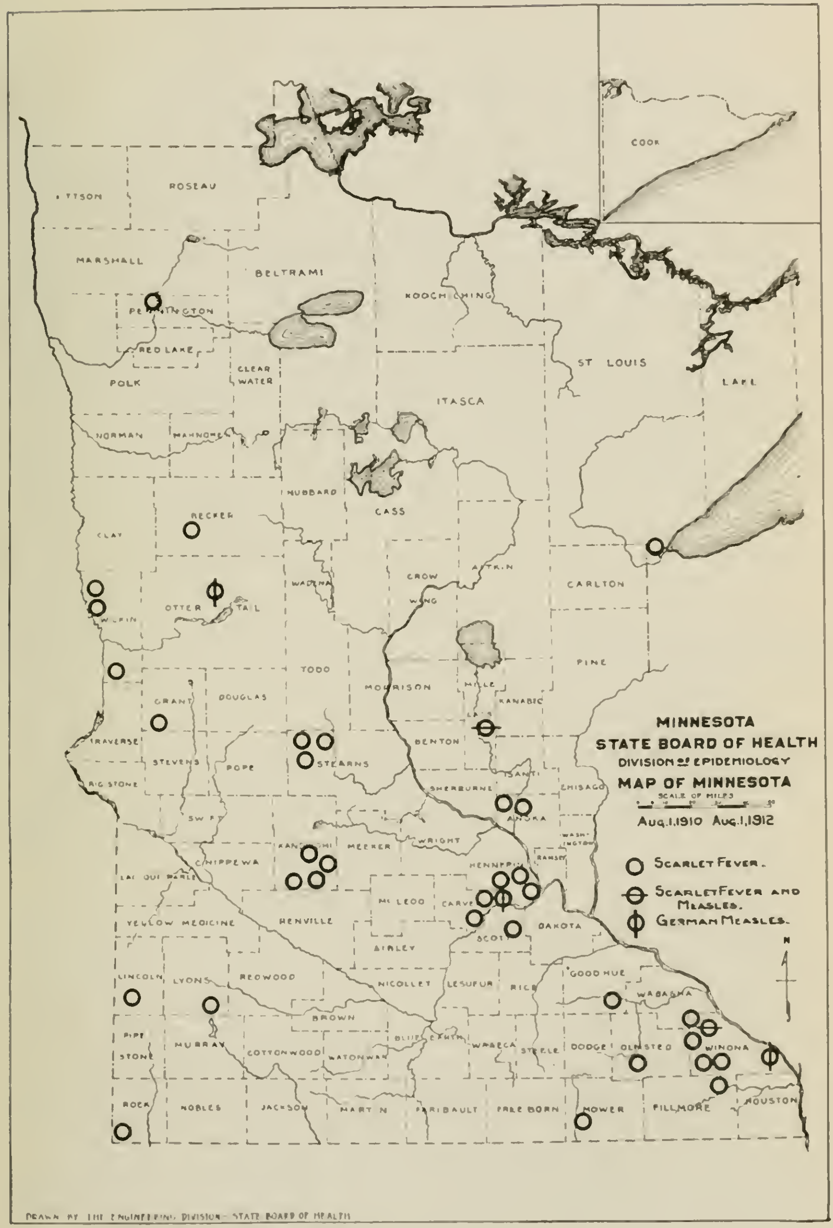
GERMAN MEASLES.

Hennepin	(C)	*Eden Prairie township	**April 17, 1911
Lac qui Parle	(H)	*Dawson village	**December 9, 1911
Otter Tail	(C)	*Vergas village	**Oct. 29-30, 1911
Rock	(C)	*Hills village	**April 6-10, 1911
		Martin township	
	(C)	*Beaver Creek township	**April 10-12, 1911
		Beaver Creek village	
Wilkin	(H)	*Campbell village	**April 25-26, 1911
Winona	(C)	Dakota village	April 15-16, 1911
		Dresbach township	
		Hartford township	

C=Dr. A. J. Chesley. H=Dr. H. W. Hill.

*Another communicable disease investigated at same time.

**Dates appear in two different places, but days are counted but once.


MINNESOTA
STATE BOARD OF HEALTH
DIVISION OF EPIDEMIOLOGY
MAP OF MINNESOTA
SCALE OF MILES
Aug.1,1910 Aug.1,1912
Scarlet Fever.
Scarlet Fever and Measles.
German Measles.
N
COOK
ROSEAU
MARSHALL
BELTRAMI
KOOCHICHING
PENNINGTON
RED LAKE
CLEAR WATER
POLK
ST LOUIS
LAKE
ITASCA
NORMAN
MAHNOMEN
HUBBARD
CASS
BECKER
CLAY
CARLTON
AITKIN
CROW WING
WADENA
OTTER TAIL
WILKIN
PINE
TODD
GRANT
DOUGLAS
MORRISON
MILLE LACS
KANABEC
TRAVERSE
STEVENS
POPE
STEARNS
BENTON
ISANTI
BIG STONE
SHERBURNE
CHISAGO
SWIFT
ANOKA
KANDIYOHI
MEEKER
WRIGHT
WASHINGTON
RAMSEY
CHIPPEWA
HENNEPIN
LAC QUI PARLE
MC LEOD
CARVER
YELLOW MEDICINE
RENVILLE
DAKOTA
SCOTT
SIBLEY
GOOD HUE
LINCOLN
LYONS
REDWOOD
NICOLLET
LESUEUR
RICE
WABASHA
BROWN
PIPESTONE
MURRAY
COTTONWOOD
WATONWAN
BLUE EARTH
WASECA
STEELE
DODGE
OLMSTED
WINONA
ROCK
NOBLES
JACKSON
MARTIN
FARIBAULT
FREE BORN
MOWER
FILLMORE
HOUSTON
DRAWN BY THE ENGINEERING DIVISION - STATE BOARD OF HEALTH

SUMMARY.

Scarlet Fever, Detroit City, Becker County, March 13, 14, 15, 16, 1912.

BY A. J. CHESLEY.

Request of Dr. L. C. Weeks, health officer.

Reason—Scarlet fever cases arising in spite of careful supervision of all reported cases led health officer to believe that mild, unrecognized or concealed cases were responsible for the spread of infection.

History—Scarlet fever existed in Detroit during the winter of 1910-1911, and Detroit schools were closed for one week in February, without influencing the epidemic favorably. Three buses bring children to Detroit schools from Detroit township. Others board in Detroit and go home at week end. Some country cases had not been reported and supervision in Detroit did not prevent new cases among school children.

Inspector consulted the health officer, the physicians and Superintendent Sharerts; of 681 pupils at Holmes and Washington public schools and at the Detroit Business Institute, I found 166 were immune and only 4 with suspicious symptoms. The superintendent's methods and the teachers' careful observation of pupils for suspicious symptoms account for the small number showing suspicious symptoms at this examination. With the health officer I visited all cases in quarantine. Those who were isolated were under excellent supervision. Sent usual letters of instruction to chairman of Detroit and Lake View townships, **re** medical health officer and **re** inspection of families whose children attend Detroit schools from the country.

Results—Statements of pupils who acknowledged having had scarlet fever proved health officer's contention that cases had existed in the country, unreported and not properly supervised, during this school year. Apparently all city cases had been handled properly except that during the health officer's absence written reports had not been made. These will be sent in later. Physicians agreed to co-operate with health officer. All absentees will be inspected and readmitted to school only upon health officer's certificate.

Inspector left Minneapolis 11:10 p. m., March 13th, arrived Detroit 5:30 a. m., March 14th. Left Detroit 5:20 p. m., arrived Minneapolis 10:00 p. m., March 16th.

SUMMARY.

Scarlet Fever, Lake Benton Village, Lincoln County, April 29 to 30 and May 1, 1911.

BY A. J. CHESLEY.

Request of Dr. W. Wakefield, health officer.

Reason—Some families had scarlet fever and did not report it; children had been sent to school. There were several families in quarantine; some were objecting to the length of quarantine necessary for their safe release.

Inspector, with health officer, visted quarantined families and examined cases. Inspected 208 pupils and 11 teachers in Lake Benton school. Instructed school officials **re** proper management during the epidemic. Prepared a statement for publication in Lake Benton News. The health officer's work deserves commendation.

Results—All quarantined cases were found to be frank scarlet fever. The health officer's opinion **re** quarantine period necessary for safe release was shown to be correct. Six pupils desquamating from scarlet fever were found and excluded from school, as well as other children in their families. The publication of inspectors' statement should assist the health officer in carrying out his duties.

Inspector left Minneapolis 9:30 a. m., April 29th. Left Lake Benton for Marshall 4:15 p. m., May 1, 1911.

EPIDEMIOLOGICAL INVESTIGATION OF SCARLET FEVER.

Rochester City, Olmsted County, January 5-9, 11-16, 23-31, February 12-16, 18-19, 1911.

To the Director, Division of Epidemiology, Minnesota State Board of Health.

Dear Sir: In obedience to the orders of the executive officer **re** scarlet fever in Rochester, five trips were made. January 5-9, 11-16, 23-31, February 12-16, 18-19, 1911. Twenty-two days were spent in epidemiological work interrupted because of urgent calls from other places for assistance.

I have the honor to report upon that part of the Rochester epidemic covered by my investigation.

Respectfully,
A. J. CHESLEY,
Epidemiologist.

First I consulted the Health Officer of Rochester, then the physicians, to get general information and specific case data. The health officer said that a small number of scarlet fever cases had been reported since the schools opened in September, 1910. A few cases had been severe, one had died. The others had been mild cases. Some cases had been called scarlet fever upon insufficient evidence in his opinion. The executive officer of the State Board of Health had visited certain cases with the health officer. No reports had been made to the State Board aside from verbal reports at the time of the executive officer's visit.

The health officer had accepted verbal reports of cases of communicable disease and never had required written reports from Rochester physicians. No written reports of scarlet fever cases had been made to the State Board of Health although certain physicians always had sent written reports to the local health officer. The infectious disease records had been entered in a pocket note book. After releasing a family from quarantine "X" was marked opposite the name in the note book. Other data such as address, attending physician, dates of first symptoms, of quarantine, and of release, the patient's name, age, etc., were not regularly recorded. These data the health officer gave from memory for the cases he personally had treated. As a rule scarlet fever patients had been released from quarantine upon the request of the attending physician without regard to the minimum quarantine period (21 days) prescribed by the State Board regulations. Formalin candles had been burned for fumigation purposes. Medical inspection of school children had been attempted by physicians who volunteered for this service. Regular effective work had been impossible because the physicians were very busy with private practice.

I gave copies of the Public Health Laws and Regulations to the health officer and to the physicians in general practice and requested them to make written reports of all cases in the future. The health officer agreed to accept written reports only; to report promptly to the executive officer; to enforce the quarantine regulations and to follow the approved methods of disinfection. The health officer and other physicians gave me from their books and from memory, all the information they had about scarlet fever cases. These cases were visited and full data collected. There were, on Jan. 9, 1911, twenty-five families in quarantine for scarlet fever. In two families there were four cases per family; in one, three cases and one case in each of the remaining families, making a total of forty cases. Having made a preliminary survey of the situation, I received orders to personally report to the State Board of Health at the meeting held in St. Paul, Jan. 10, 1911.

After a consideration of my report, the Board ordered me to return to Rochester and to assist the Health Officer to get the epidemic under control and to institute proper and adequate methods of supervision at once.

January 11th, I returned to Rochester, found that the health officer had purchased kettles and chemicals for the Formaldehyde Permanganate disinfection method and had forms printed to be filled out when disinfection was done, giving the quantity of materials used and the amount due the city. This bill the house-holder took to the city clerk for settlement and thereby relieved the health officer of further responsibility. In conjunction with Miss Jamme, superintendent of nurses, St. Mary's hospital, the health officer had written, "Instructions for Care of Patients with Infectious Diseases" and had a good supply printed for distribution among the families concerned. At my request he provided a blue-print of the city, a card index file and certain printed forms, namely "Declaration," "Wage-Earners' Permit," "Health Officer's Certificate," "Scarlet Fever Case Data."

I visited new and suspected cases and persons exposed to cases, brought the epidemological data up to date, tabulated it on three-inch by five-inch cards in the filing index and prepared a daily record sheet for the health officer's use. I disinfected two houses in order to demonstrate the details of the approved methods and gave typewritten directions about the collection, tabulation and filing of data, after fully explaining its practical application. With the superintendent of schools, a system of supervision was worked out for the public schools. This met with the approval of the officers of the private schools and was endorsed for use in Olmsted county by the county superintendent of schools.

I was ordered to Rushford January 16, 1911, and did not return to Rochester until January 23d. I found that the health officer had failed to carry out the measures outlined for the control of scarlet fever, although he evidently had done his best. He had a large private practice and could not afford for $150 per year, the health officer's salary, to devote his whole time to health work. The health officer and his assistant, Captain Thurber of the board of health, often took me about the city to visit cases, using the health officer's horse for this purpose. In spite of many difficulties the health officer tried to do his work well and to assist me, until, from circumstances seemingly unavoidable, his attitude changed. In reacting to the sting of local criticisms and thorugh inexcusable misinterpretations of the motives of those co-operating in the work, he added to the ordinary difficulties of the situation tremendously.

Throughout my work in Rochester, I found the physicians ready to sacrifice their own time and convenience to give me information and assistance. Many other persons, the officers of the civic league, the teachers and superintendent of schools especially, took great interest in the work and rendered invaluable assistance. The board of education approved of the time spent by teachers in preparing records and generally supervising pupils. The civic league loaned its visiting nurse to the city and used its influence with the city council.

Deaconess Margaret Snyder, the Civic League's visiting nurse, was especially well fitted for her work, being a tactful social worker of long experience as well as a trained nurse. Her work was opposed and unjustly criticised by certain persons who should have given her support and appreciation. Miss Snyder visited each quarantined family, gave instructions about the isolation and care of the patient, assisted in inspection of school children, in following up absentees, in collection and tabulation of data, and through the Civic League supplied the necessities to the poor.

My work was of a general character; in fact its chief object was the education of the public. In order to allay undue fears in some people and to bring others to realize the seriousness and magnitude of the epidemic, it was necessary to trace out old cases to show the way the disease had been spread for months without restraint, to investigate the cause of absence from school, to make differential diagnosis in suspicious cases, and to inquire into all the various possible modes of infection as well as to keep up the immediate work of supervision. The essential trouble was due to the mild character of the epidemic. To have magnified or minimized the seriousness of the situation, rather than to have reported the exact truth, would have met with popular approval and made the situation less uncomfortable and some people could not understand why so much "fuss" should be made about it when the epidemic was so mild.

The health officer's blue print was used as follows:

The map location of each house where scarlet fever existed was shown by a red circle bearing the map index number. As secondary cases developed in the house, each one was noted by adding a red star. point to the circle. Each school was shown by a gold star. The district boundaries of the grade schools were marked in colors. A map index sheet was compiled giving the map index number, date of first symptoms, address and name of the family, number of primary and secondary cases, and the name of the attending physician. Case data cards were filed in the card index under date of first symptoms and under the initial of the family name.

The school record gave the name and address of each scarlet fever patient, age, sex, date of quarantine, nature of isolation, date of release, date of school permit, name of school and teacher, if the patient was a pupil, and sufficient data for all children living in the same house with the patient. Each teacher reported to the superintendent immediately after morning roll-call, the names of the absentees. The visiting nurse followed up every absentee and if suspicion of infectious disease was found, the school was given the benefit of the doubt through the exclusion of all pupils concerned until a definite diagnosis was made. Under the medical supervision of Dr. Crewe, the schools became the safest place for the children, but the health officer did not permit this good work to be continued as long as it should have been.

The city council approved of medical supervision in the schools and provided funds to pay the salaries and expenses of the medical supervisor and two nurses in addition to the one furnished by the civic league. This action was taken at a special public meeting of the council January 30, 1911. At this time I explained the whole situation, giving reasons for the unusual measures advocated, showing by the blue print, by school inspection, field and other records, the distribution, number and character of the cases. The city attorney quoted and explained the state law and the State Board of Health regulations. The questions of procedure were thoroughly discussed by the city officials and by Drs. C. Graham, C. H. Mayo, L. B. Wilson and O. C. Heyerdale.

Before Dr. Crewe began his work the executive officer of the State Board of Health visited Rochester and held a conference at the surgeons' club, February 18th with Drs. Graham, Adams, Crewe, Wilson, Superintendent Woodfield, Rev. Father Commisky, Miss Snyder and the public health committee of the civic league, Mrs. Van Tassell and Miss Jamme. After a thorough discussion of the situation, the executive officer gave explicit directions for the management of the work in the future.

The amount of work done by the teachers with practically no interruption of classes, shows what great interest teachers always have in their pupils' welfare and shows the excellent discipline maintained by Superintendent Woodfield. The school records and a great deal of related data may be found in the files of this division and of the superintendent of schools, but only the essential epidemiological data is tabulated in this report.

The figures given below were noted in summarizing the situation for the city council, January 30, 1911:

PRELIMINARY INSPECTION BY MISS SNYDER AND DR. A. J. CHESLEY, ROCHESTER SCHOOLS.

School.	Enrolled.	Present.	Vaccinated.	Scarlet Fever.	Suspicious.	Absent.
Central	275	223	88	24	26	52
K. P. Hall.......	116	95	52	8	11	21
High	207	180	153	28	5	17
Northrup	169	146	15	31	20	23
Phelps	125	90	20	6	13	35
Hawthorn	115	101	*28	8	16	14
Holmes	114	108	20	6	15	6
Convent	201	159	52	17	25	42
German	83	61	8	12	10	22
	1,405	1,163	436	140	141	232

*Two had smallpox.

Up to Jan. 30, 1911, 160 cases of scarlet fever had been found in 94 families, 59 having been infected through contact with patients not isolated. On this date there were in quarantine, 31 cases in 20 families.

The efficiency of systematic supervision is indicated by quotation from a letter dated March 14th from Superintendent Woodfield:

> "The scarlet fever situation here is clearing up very rapidly right now. Yesterday we had fifty pupils back in school and only twenty-eight out. Dr. Crewe examined and put back yesterday about thirty who had come out of quarantine."

Dr. Crewe has briefly summarized his work as follows:

At the request of Drs. Hill and Chesley of the Division of Epidemiology of the State Board of Health, I make the following brief report of my work as school inspector at Rochester during the scarlet fever epidemic in 1911. Was appointed by the health officer, Dr. A. S. Adams, and began work February 17, continuing until April 10, when my services were deemed not further necessary, the epidemic having somewhat abated. I was assisted by Miss Margaret Snyder, who kept the reports and assisted at all examinations and visited all absentees. Her services were given to the city by the civic league who employ her as visiting nurse.

Number of pupils examined in school	1,420
Number of absentees examined	160
Number of homes in quarantine, February 17	44
Number of cases	74
Number of homes in quarantine, April 10	23
Number of cases	30

The daily work consisted of examining all absentees returning to school—all suspicious cases reported by teachers or superintendent—all absentees visited by Miss Snyder—general inspection of pupils for contagious disease in some one school each day. Reports were kept and made to State Board of Health by Miss Snyder. Records of all pupils who had had measles, scarlet fever, diphtheria, and had been vaccinated were also made; also other physical records made. The school buildings were all inspected.

All reports of absentees were sent in each morning by the teachers to Superintendent Woodfield, who gave them to Miss Snyder. Superintendent Woodfield was very cautious and used every effort to make the inspection efficient.

"Inspections were also made at the parochial schools."

Respectfully,

(Signed) J. E. CREWE.

Headings for tabulations of scarlet fever data used with "spot map":

ROCHESTER SCARLET FEVER INCIDENCE AND DISTRIBUTION.

	Primary Cases				Secondary Cases		
Date First Symptom	Patient	Location			Date First Symptom	Patient	Age
		School	Map	School			

Primary cases are recorded in order of dates of first symptoms.

Secondary cases are entered on same line as primary case from which the infection came.

INDEX TO SCARLET FEVER LOCATIONS ON ROCHESTER MAP.

Map No	Address While Quarantined	Name of Householder	Case Numbers	
			Primary	Secondary

Map location numbers are given when the disease is first found to be present in the house.

Case numbers are given in order of the dates of first symptoms to primary cases. **Secondary cases** take the same numbers as the primary of the household from whom the infection occurred and in addition a letter, i. e., primary case No. 15 caused the sickness of secondary cases No. 15A, No. 15B, etc.

In these tabulations up to June, 1911, there were listed 192 locations where 218 primary and 101 secondary cases of scarlet fever existed.

Adequate isolation and effectual quarantine were difficult to enforce because the cases were generally mild and the people became careless during convalescence. Most of the "secondary" cases of the list were derived from the "primary" cases of the same household. The medical supervision affected marked reduction in the number of cases amongst children. Similar supervision of adults was neglected for various reasons and the number of adult "primary" cases (30) is remarkable when the adults' relative insusceptibility is considered.

In this report the term "primary" is applied to the earliest case developing in a family, the infection having been incurred outside the family; the term "secondary" is used for subsequent cases due to infection from a "primary" case in the family. In other words the "secondaries" are family group infections while the "primaries" are community infections.

SUMMARY.

Scarlet Fever, Rochester City, Olmsted County, January 5-9, 11-16, 23-31, February 12-16, 18-19, 1911.

BY A. J. CHESLEY.

Request of various citizens of Rochester.

Reason—Local health officer failed to control mild scarlet fever cases and an epidemic developed after the schools were opened.

History—Scarlet fever infection was carried through the summer by a few scattered cases. When the schools opened mild cases, frequently unrecognized, caused widespread exposure and new cases which were confined at first chiefly to the Northrup district, spread from there throughout the city.

Inspector collected epidemiological data of all cases, inspected school children, followed up absentees, instructed families about the management of cases, brought the health officer's records up to date, established office systems for health officer and the school authorities and reported the situation to the city council and the public, making certain recommendations.

Results—Through medical supervision of schools and persistent following up of exposed persons the situation was well developed and brought under fairly good control by the combined forces of school and health departments aided by volunteers.

Time of inspector, twenty-two days.

SUMMARY.

Scarlet Fever, Rochester City, Olmsted County, April 23 to May 1, 1912.

BY A. J. CHESLEY.

Request of citizens, per Dr. L. B. Wilson.

Reason—Sudden outbreak of scarlet fever caused alarm and indicated uncommon or uncontrolled factors in the spread.

History—Scarlet fever records for Rochester are as follows:

		Adults		Children			
		Primary.	Secondary.	Primary.	Secondary.	Total Cases.	Families Affected.
1911	September	1	0	3	0	4	3
	October	1	0	3	1	5	4
	November	3	0	14	1	18	14
	December	1	0	5	2	8	5
1912	January	0	0	4	0	4	4
	February	0	0	1	1	2	1
	March	0	0	3	0	3	3
	April	45	0	18	0	63	54

Dr. A. S. Adams, health officer, finding that many families affected were supplied by the same milkman whose family was quarantined for scarlet fever, charged the outbreak to the use of infected milk.

Inspector, with Dr. Adams, visited cases and C. M. B.'s dairy, Cascade township, Olmsted county, found that the provisions of regulation No. 10 had been carried out under the supervision of Dr. Chas. Granger and by permission of the chairman board of supervisors. All evidence indicated that infection had not been carried by milk. Contact with persons who developed scarlet fever was traced for primary cases attributed to milk infection. Dr. B. S. McGrath, of the Mayo clinic, assisted in inspection of hotel, boarding house and livery employes. Data were card indexed as to hours and kind of work, period of service, boarding and rooming places and associates, history of previous scarlet fever, present condition, and so forth. Dairies and dairy employes were inspected and their data card indexed also.

Results—Proof of milk infection was lacking, of contact infection sufficient to account for outbreak. Uncontrolled factors, i. e., workers in contact with transients, dairy and creamery employes, etc., were brought under supervision. Cases were discovered and quarantined. Suspects were isolated for observation.

Left Minneapolis April 23d, 3:45 p. m., Great Western Railway, arrived Rochester 9:00 p. m. Left Rochester 6:55 a. m., arrived Minneapolis 11:30 a. m., May 1, 1912.

SUMMARY.

Scarlet Fever, Rochester City, Olmsted County, May 2-11, 1912.

A. J. CHESLEY.

Request of Dr. C. H. Mayo, health officer.

Reason—Dr. A. S. Adams resigned his office of city health officer May 1st and Dr. C. H. Mayo was appointed city health officer.

History—(See report of investigation of April 23-May 1 for details of outbreak.) Chiefly adults were attacked and the disease spreading amongst visiting patients and physicians, caused general alarm. Visitors left city; patients, physicians and business men coming to Rochester turned back. The situation was critical and the Rochester Commercial Club demanded protection of the people and business interests.

Inspector assisted Dr. B. F. McGrath, deputy health officer, to get the situation in hand, to organize the forces and to systematize the work of the health department. Dr. C. H. Mayo placed the staff of the Mayo Clinic at the disposal of the department. Local physicians served without pay as school inspectors to meet the emergency.

Results—The new organization began work May 2d with sixty-three known cases of scarlet fever in fifty-four locations. Several old but unknown cases were found and quarantined. All persons exposed to new cases were kept under supervision for a week, and every measure useful in the control of the disease was applied without delay. (See details of organization of work.) On June 10th there were thirteen cases of scarlet fever in nine locations. No diphtheria existed and only one case of measles. On June 22d eight locations and ten patients had been released from quarantine, leaving the city practically free from all infectious diseases. This demonstrates what can be accomplished when the people co-operate with the authorities and when the work of the health department is carried out under the direction of a competent health officer. Deaconess Margaret Snyder, the visiting nurse of the Civic League, deserves special mention for the great assistance she rendered in this work.

Inspector left St. Paul May 2d, 4:15 p. m., Chicago Great Western, arrived Rochester 8:30 p. m. Left Rochester 6:55 a. m., arrived St. Paul 11:00 a. m., May 11, 1912.

EPIDEMIOLOGICAL INVESTIGATION OF SCARLET FEVER.

Thief River Falls, Pennington County, March 2, 3, 4, 1911.

To the Director Division of Epidemiology, State Board of Health.

Dear Sir: In obedience to your orders, re scarlet fever at Thief River Falls, Pennington county, I left Minneapolis 11:10 p. m., March 1, 1911, Great Northern Railway, and arrived at Thief River Falls at noon, March 2, 1911. Completing my investigation, I left at 10:45 p. m., March 4, 1911, Soo Railway, and arrived in Minneapolis at 7:15 a. m., March 5, 1911. I have the honor to submit a report on this investigation.

Respectfully,
A. J. CHESLEY,
Epidemiologist.

In reporting this investigation, the method of procedure will be outlined and explained. Arriving in Thief River Falls Thursday noon with no data, I spent the afternoon in getting **general information.**

"A"—From the health officer and physicians re general character of epidemic and its management; re number of cases each physician had attended:

Mild widepsread epidemic, in and outside the city, chiefly amongst children of school age, no fatal and very few severe cases, few families employed physicians, diagnosis questioned (German measles or scarlet fever); the few cases reported had been properly managed by the health officer.

"B"—From the superintendent of schools re number pupils enrolled; number of teachers; schools; absentees sick during epidemic: cases of known or suspected scarlet fever in families where pupils or teachers attended:

One thousand and sixty-eight pupils; twenty-six teachers, four schools; number of pupils absent on account of illness was unusually large; some pupils had returned to school while desquamating and had been excluded by the superintendent; uninvestigated suspicious cases had been reported to the superintendent.

I prepared school inspection sheets for the tabulation, as follows of specific information:

SCHOOL INSPECTION SHEET.

Thief River Falls, March 3, 1911.

........................School
........................Teacher Total number enrolled......................
........................Grade Total number present......................
Age Name Scarlet fever, vaccination, remarks

And samples (3x5-inch cards) for non-resident pupils:

NON-RESIDENT PUPIL'S CARD.

Name	Father's name	Township
Age	Postoffice	
Sex		
School		Teacher
Scarlet fever—Vaccination		
Visits to home		

Non-resident pupils were classified in three groups according to the time they spent at home.

Class "A" those who went home every night.
Class "B" those who went home week end only.
Class "C" those who went home vacations only.
And sample cards for absentees:

ABSENTEE'S CARD.

Address	
Date	School
Absent	Teacher
Name	

The inspection was conducted as follows:

The superintendent detailed teachers to enter data on sheets and cards; announced briefly the purpose of the inspection; directed pupils seated at attention to face to the right, stand, pass to the rear of the room and to approach the inspector in single file.

The inspector, standing beside a well lighted window, estimated at a glance the physical condition of each pupil, carefully examined the mouth, throat, tongue, neck, ears, hands and wrists for suspicious symptoms, and gave every pupil presenting such symptoms a card. Neither teachers nor pupils knew the significance of this card.

The teacher recorded the pupil's name, age and other data as follows:

"X" before name of pupil with card=suspicious symptoms.
"No" under "scarlet fever"=pupil never had scarlet fever.
"Yes" under "scarlet fever"=pupil has had scarlet fever.
"The date" under "scarlet fever"=pupil had it during this year.
"No" under "vaccinated"=pupil is not vaccinated.
"SP." under "vaccinated"=pupil has had smallpox.

Under "remarks,' the parent's initial or the guardian's name was entered and for non-resident pupils, their home township and postoffice also.

Cards for non-resident and absent and suspicious pupils were filled out.

HOME ADDRESS OF THIEF RIVER FALLS NON-RESIDENT PUPILS TO SHOW DIFFERENT SANITARY DISTRICTS INVOLVED IN THIS EPIDEMIC, ESPECIALLY IF SCHOOLS CLOSED.

States Involved, 3; Counties Involved, 10; Townships Involved, 23; Cities and Villages Involved, 7; a Total of 33, State and Local Boards of Health Concerned.

Non-resident pupils	In High School.	In Grade Schools.	Total, 59.
Class "A"=go home every night	6	5	
Class "B"=go home at week end	8	0	
Class "C"=go home at vacation	40	0	

County	Beltrami	Clay	Lyon	Mahnomen
Township, village, city	Langor	Humboldt	Marshall city	Duane village
Class "A"	0	0	0	1
Class "B"	0	0	0	0
Class "C"	1	1	1	0

County	Marshall				
Township, village, city	Whiteford village	Agder	Excel	Holt	Newfolden
Class "A"	0	0	0	0	0
Class "B"	0	0	0	0	2
Class "C"	1	1	1	1	6

County	Marshall			Otter Tail
Township, village, city	Rollins	Spruce Valley	Viking	Deer Creek
Class "A"	0	0	0	0
Class "B"	0	0	0	0
Class "C"	1	1	2	1

County	Pennington			
Township, village, city	High Landing	Mayfield	North	River Falls
Class "A"	0	0	8	0
Class "B"	0	0	0	1
Class "C"	1	1	0	0

County	Pennington			Polk	
Township, village, city	Rocksbury	Sanders	Smiley	Angus	Queen
Class "A"	2	0	0	0	0
Class ' B"	3	0	2	0	0
Class "C"	7	1	0	1	1

County	Red Lake			Roseau
Township, village, city	Emardsville	Reiner	Wyandotte	Roseau village
Class "A"	0	0	0	0
Class "B"	0	0	0	0
Class "C"	3	1	1	1

County	Roseau	
Township, village, city	Warroad village	Skagen
Class "A"	0	0
Class "B"	0	0
Class "C"	1	1

State	North Dakota	Wisconsin
City	Fargo	Lac du Flambeau
Class "A"	0	0
Class "B"	0	0
Class "C"	1	1

The inspection of a room averaging 35 pupils required about ten minutes; the collection of data about twenty minutes. There was no time wasted and no confusion or disorder among the pupils. After the noon hour the work was resumed and finished at 4:10 p. m. A summary was then made of each school and of all schools.

SUMMARY OF SCHOOL INSPECTION DATA.

LINCOLN HIGH SCHOOL, THIEF RIVER FALLS, J. H. HAY, SUPERINTENDENT.

Teacher.	Pupils' Ages.	Scarlet Fever.	Vaccination.	Present.
Janet C. W.	14-32	7	27	46
Gertrude S.	14-20	7	22	47
S. H. H.	15-20	12	30	55
Louise E. T.	15-21	2	3	9
Enrolled, 188; absent, 31		28	82	157

WASHINGTON (GRADE SCHOOL), THIEF RIVER FALLS, MARCH 3, 1911.

Teacher.	Grade.	Ages.	Scarlet Fever.	Vaccination.	Present.	Absent.
Katheryn K.	VIII	13-17	4	18	31	3
Stella C.	VI	11-16	8	8	36	7
Laura H.	II and III	7-11	4	3	25	7
Emma L. B.	K	6- 9	0	2	31	18
Eliz. T.	IV and V	9-15	10	10	42	5
Mame P.	VII	12-16	11	11	32	4
Anna C.	VII	13-17	4	15	39	2
Hilda E.	VIII	12-16	7	17	29	4
Enrolled 315			48	84	265	50

K=kindergarten.

CENTRAL (GRADE SCHOOL), THIEF RIVER FALLS, MARCH 3, 1911.

Teacher.	Grade.	Ages.	Scarlet Fever.	Vaccination.	Present.	Absent.
Edna A. L.	II	8-10	6	6	34	6
Rachel S.	V	10-15	5	12	31	7
Nettie W.	III	7-11	8	12	35	8
Alma A.	I	6- 9	11	6	50	7
Mrs. O.'B.	VI	11-14	16	17	37	6
Mary McQ.	IV and VI	9-17	9	15	32	7
G. McC.	K	5- 9	4	8	33	18
Enrolled 311			59	76	252	59

K=kindergarten.

KNOX (GRADE SCHOOL), THIEF RIVER FALLS, MARCH 3, 1911.

Teacher.	Grade.	Ages.	Scarlet Fever.	Vaccination.	Present.	Absent.
Miss Ward..........	III and V	8-14	8	7	38	10
Julia L...............		8-15	6	12	42	11
F. W. C...............	I	6-10	8	2	37	5
Nellie S..	K	5- 9	2	1	31	4
Hazel A...............	II	7-11	6	8	25	9
Mary H...............	VI	11-15	8	15	36	6
Enrolled 254.........			38	45	209	45

K=kindergarten.

SUMMARY OF ALL SCHOOLS.

THIEF RIVER FALLS PUBLIC SCHOOLS, J. H. HAY, SUPERINTENDENT.

School.	Enrolled.	Present.	Suspected.	Vaccinated.	Absent.	Scarlet Fever.
Lincoln high school....	188	157	6	82	31	28
Teachers	5	5	0	0	0	0
Washington	315	265	27	84	50	18
Teachers	8	8	0	7	0	1
Knox	254	209	17	45	45	38
Teachers	6	6	0	5	0	3
Central	311	252	39	76	59	59
Teachers	7	7	0	7	0	1
	1,094	909	89	311	185	178

The last table shows that 89, or 10 per cent, of the 883 pupils showed suspicious symptoms; that 173, or 19½ per cent, had had scarlet fever; of these, 41 had it during the school year, 29 between September 1, 1910, and January 1, 1911, and 12 between January 1, 1911, and March 1, 1911, and that 185 were absent for unknown reasons March 3, 1911.

Incidentally it was noted that **only 287 of the 883 pupils and 24 of the 26 teachers inspected were protected against smallpox.**

To find out the relation between pupils who had had scarlet fever and pupils with suspicious symptoms and pupils absent for unknown cause, the cards were filed alphabetically in the card index and studied. One or two examples will be sufficient to illustrate the value of this procedure.

Thief River Falls, Central, March 3, 1911; teacher, Miss A.

Absent, Stella A.	Scarlet Fever.	Vaccinated.	School.	Teacher.
Gladys (X), age, 9.........	0	0	Central	Miss L.
Pearl (X), age, 11..........	0	0	Central	Miss T.

Data indicate probable scarlet fever in absentee.

Thief River Falls high, F. E. W., guardian.
March 3, 1911; girl's home is Grand Rapids, Wis.
Absent, Elaine S., 16, F.
Chum and neighbor of Gertrude S. (suspicious throat).
Mate in cooking class, Emma R.
At school March 1, 1911; sick in bed, March 2, 1911.
Visited house with Dr. Mellby, made diagnosis of scarlet fever. No rash, tongue characteristic, tonsils red and hypetrophic. Professor Hay noted in school flushed face, March 1, 1911.

Having noted such apparent relationships and having summarized the school data, I went over each case with the health officer to ascertain whether the case had been reported to him and if not, what physician usually attended the family, etc. Next I consulted the family physician about these cases and from their books or recollection got further information which was entered on the cards. In going over these, it was apparent to all that many cases not considered to be scarlet fever were scarlet fever, and that the extent of the epidemic had not been appreciated.

Having analyzed this data and visited the cases in quarantine and where the diagnosis was in question, I arranged to meet the school board at 9 p. m., March 4, 1911. Mr. Lars Bakke, president, Dr. G. A. Penny, clerk, Mr. Carl Zah, of the school board, Superintendent J. H. Hay, Dr. O. F. Mellby, Dr. H. G. Heber and others were present. Dr. H. Grundy, health offices was called away from the meeting.

The situation was outlined by me and discussed freely. The board wished to do everything in its power to prevent the spread of the epidemic. I showed them that one day's work in the school had given valuable data. Forty-one (41) cases of scarlet fever, few of which had been attended by physicians, had been discovered. The relationship between known cases, pupils with suspicious symptoms, and absentees, suggested that other cases would be discovered, upon investigation, in the families of such pupils. This investigation I did not have time to make but sent the health officer and superintendent of school outlines for such work, first, with the existing forces, i. e., the health officer, superintendent of schools and teachers, with voluntary co-operation of practicing phyisicians; second, with the existing forces, visiting nurse and medical inspector for the schools.

The danger from non-resident pupils was explained. Those in class "A" who go home every night, live near the city and may be looked up readily. Those in class "B" who go home weekly are most dangerous. Such pupils might be exposed for three nights and two days to some one at home infected with scarlet fever, and after returning to school, come down with scarlet fever a few days before the week end thus expose school children. Those in class "C" who go home vacations are practically continuous residents of the city. A week's vacation means about ten days absence from the city. This period exceeds that of scarlet fever incubation. These pupils live at considerable distance from the infected center and are not likely to be exposed to scarlet fever at home but may introduce it there.

To check up the health of the families of non-resident pupils, a letter was sent to certain township health officers. The contents of this letter were explained to the pupils concerned.

A sample card outlining the usual epidemiological data was prepared for the use of the health officer or agent, as follows:

Map location No.   Case No.
Address of house quarantined.   Name of head of house.
Patient's name.   Age.   Sex.   Home address and initials of parent.
Associates who have or have had scarlet fever and when.
Day school.   Teacher.   Church and date.
Date of first symptoms of first eruption.   Persons exposed.
Date first seen by doctor.   Nurse's name.
Date of quarantine.   Of isolation.   How isolated.
School or library books at home.   Notice to school, church, library.
Source of milk.   How handled.
Is any dairy product sold by family?
Laundry before and during illness.
Names, ages, school of children in household.
Wage-earner's permits,   occupations,   names,
Patient's condition (desquamation, nose, throat, ears, discharges three weeks after first symptoms.   Date of school permit.

Examination into the probable source of infection of each reported case, should discover some old unreported cases; some new unrecognized cases might be found by following up the persons exposed to reported cases, etc. The practical value of these data would depend how complete the investigation was and how promptly the cases in the infective stage were recognized and quarantined, and whether persons exposed to such cases were isolated or kept under quarantine during the ten days following the last exposure.

OUTLINE OF WORK FOR EXISTING AGENCIES.

The superintendent directs following up of absentees to ascertain cause of absence and the keeping of the records.

The teachers report to the superintendent as early as possible each morning the absentees with whatever related information they know.

In the superintendent's office all such information should be filed, classified and collated with previous data. The use of the card index system will expedite and simplify this work and afford convenient reference.

A list of all children in a family where infectious disease exists should be kept, either in a card index or on daily record sheets or both, as follows:

Name.	Address.	Person Sick.	Disease.
John Smith........................	No. 5 Main St.	Self	Scarlet Fever
Mary Smith........................	No. 5 Main St,	John	Scarlet Fever

Is Patient Isolated?	Quarantine Release.	School Permit.	School.	Teacher.
Completely	February 28, 1911	March 12, 1911	Central	Brown
		March 12, 1911	Central	Jones

Health officer certificates (see copy enclosed) are to be filed in card index. One should be required of every pupil returning after an absence caused by an unknown illness or an infectious disease affecting the pupil or his household.

Non-resident pupils must stay in town or have certificates from family physicians or township health officers if they go home every night or at week ends. The township boards will be notified by the State Board of Health and advised to appoint a medical health officer for the town or to employ the family physician for this inspection. Pupils failing to comply with inspection regulation should be excluded from school unless they have scarlet fever and are therefore immune.

Teachers should watch over their pupils carefully and if any show symptoms of a suspicious character, sore throat, coughing, sneezing, fever, flushing of face or skin, eruption or complai of headache, enc., she should refer such pupils to the superintendent for advice. If he deems best he will call the health officer to make a diagnosis or send the pupil to the family physician. The superintendent and teachers have authority to exclude any pupils on suspicion.

The health officer's and physician's duties should be as follows:

Physicians—The school authorities may get good supervision if the physicians will volunteer to inspect the children of families employing them as family physicians and determine the nature of suspicious symptoms and the condition of children recovered from scarlet fever or exposed to it before their readmittance to school.

Health Officer—The health officer should inspect suspicious children at school and pass upon children wishing to enter school after an absence caused by the illness of the pupil himself, or a member of his family, not attended by a physician.

In addition to his regular duties as health officer, he should be ready to respond to the call of the superintendent of schools. For his extra work outlined above he should receive compensation in addition to his regular salary as health officer.

Extra clerical assistance may be needed by the superintendent.

(Next see plan when nurse is supplied.)

OUTLINE OF WORK FOR EXISTING AGENCIES AIDED BY NURSE. VISITING NURSE'S INSTRUCTIONS FOR SCARLET FEVER CASES.

Notify the attending physician that you wish to visit the family to obtain data.

Data—Make a separate card for each patient following the order outlined for epidemiological records.

Filing Index—Put the original epidemiological data card in the calendar file under date of first symptoms.

Isolation—According to circumstances and after consulting the attending physician make the best provision for the protection of the family which in your judgment can be carried out. Instruct and show the person caring for the patient how to conduct her work in order to limit the infectious material as much as possible.

Wage Earners' Release—In suitable cases arrange with the health officer for written permit for the wage earners to resume their ordinary duties.

Daily Record—Enter on daily record sheet the required data.

Quarantine Release—At the end of the third week after date of first symptoms, if quarantine is released, file the card in alphabetical index under the first letter of family name, recording condition of patient's skin, throat and ears.

Epidemiological Records—Forward cards to Dr. H. W. Hill, director, Division of Epidemiology, Minnesota State Board of Health, Minneapolis, Minn., when quarantine is released, unless the week end inspection applies to the case. In this event keep the card in alphabetical index file until school permit is issued, then complete the record and forward to Dr. Hill.

FOR SCHOOL WORK.

Absentees' List—The superintendent of schools will have teachers prepare lists of all pupils absent.

Investigation of Cause of Absence—By visiting the family or by 'phone the nurse should find out the cause of absence. In suspicious cases (advise with the health officer for classification) notify the family physician and make arrangements for the observation of the patient until infectious disease is excluded, when patient may be permitted to return to school by the health officer's certificate.

Daily Record—Keep a daily record of all school work done and file report with superintendent of school. Report to the school board, first submitting the report to the health officer and superintendent for their approval, giving a summary of the work done and results obtained.

Through the superintendent and teachers, careful observation of pupils in school should be made and every pupil with the slightest suspicion of eruption, sore throat or initial symptoms of scarlet fever, should be examined by the nurse. If she is suspicious of the case it should be referred to the family physician and record made of the facts.

(Nurse would cost $20 a week for salary.)

(Next see plan for medical inspector in addition to nurse.)

OUTLINE FOR WORK OF EXISTING AGENCIES AIDED BY NURSE AND MEDICAL INSPECTOR.

Medical Inspector's Duty—The medical inspector should come to the superintendent's office at 9:00 a. m., to outline the nurse's duty for the morning, re visiting absentees. He should inspect all pupils referred by teachers on suspicion and record results.

He should visit each school building for this purpose after the absentee lists have been received at the superintendent's office and checked over to outline work for the nurse.

Symptoms of scarlet fever, measles. diphtheria and other contagious diseases should be carefully watched for. The investigation of suspicious cases in absentees referred for diagnosis should be done by inspector to save time of the health officer and expense to the family. However, he should not treat any case as medical school inspector, but should refer the case to the family physician for medical care.

School permits (health officer certificates) may be signed by inspector after examination of the children and the health officer relieved of this responsibility.

He should frequently have a general inspection of all pupils.

(Pay should depend on time necessary to do the work.)

LIST OF INVESTIGATIONS.

SMALLPOX, CHICKENPOX.

Thirty-three epidemiological investigations of smallpox and chickenpox were made during the biennial period August 1, 1910, to August 1, 1912, in eighteen counties. The field required thirty-six days. No reports or summaries for investigations made between August 1, 1910 and January 1, 1911, are included since this work was covered in the first report of this division.

As to smallpox, one word is sufficient—VACCINATE.

SMALLPOX.

County.		Township, Village, City.	Date.
Anoka	(C)	Linwood township	February 20, 1912
Chisago	(H)	*North Branch village	**November 8, 1911
	(C)	Lent township	February 19, 1912
Dodge	(C)	Dodge Center village	January 27, 1912
Douglas	(C)	Spruce Hill township	**June 20-21, 1911
		Miltona township	
Fillmore	(C)	Preston village	May 5, 1911
		Lanesboro village	
	(C)	Fountain township	May 6, 1911
	(C)	Arendahl township	Feb. 12-13, 1912
Hennepin	(H)	Orono township	August 26, 1911
	(C)	Minneapolis city, Elliot Hospital	November 10, 1911
	(C)	Orono township	January 24, 1912
	(C)	Minneapolis city, University of Minnesota student	February 24, 1912
Lyon	(C)	Cottonwood village	Feb. 11-12, 1911
	(C)	Lucas township (see Yellow Medicine county)	**May 20-21, 1911
	(C)	Custer township	**July 25-27, 1912
Murray	(C)	Lake Sarah township	July 25-27, 1912
Olmsted	(C)	Rochester city	May 7-8, 1911
	(C)	Rochester city	May 12, 1911
Otter Tail	(C)	Parkers Prairie village	June 20-21, 1911
		Eastern township	
		Effington township	
Ramsey	(C)	*White Bear village	**January 18, 1912
Rice	(C)	Lonsdale village	January 25, 1912
		Webster township	
St. Louis	(C)	Rice Lake township	June 22-24, 1911
Scott	(C)	Cedar Lake township	Sept. 26-28, 1911
	(C)	Shakopee city	January 3, 1912
Watonwan	(C)	Antrim township	Feb. 9-10, 1912
		Fieldon township	
		South Branch township	
Yellow Medicine	(C)	Wood Lake village	May 20-21, 1911
		Wood Lake township	
		Echo village	
		Echo township	
		Sioux Agency township	
		Posen township	

CHICKENPOX.

Chisago	(H)	*North Branch village	November 8, 1911
Dakota	(C)	South St. Paul city	December 11, 1911
Ramsey	(H)	Rose township, Department of Agriculture, University of Minnesota	October 25, 1911
	(C)	Rose township, Department of Agriculture, University of Minnesota	November 11, 1911
	(C)	*White Bear village	January 18, 1912
	(H)	St. Paul city	January 29, 1912
Rock	(C)	Beaver Rock village	**April 10-12, 1911
		Beaver Creek township	

C—Dr. A. J. Chesley. H—Dr. H. W. Hill.

*Another communicable disease investigated at same time.

**Dates appear in two different places, but days are counted but once.

SUMMARY.

Smallpox, Lent Township, Chisago County, February 19-20, 1912.

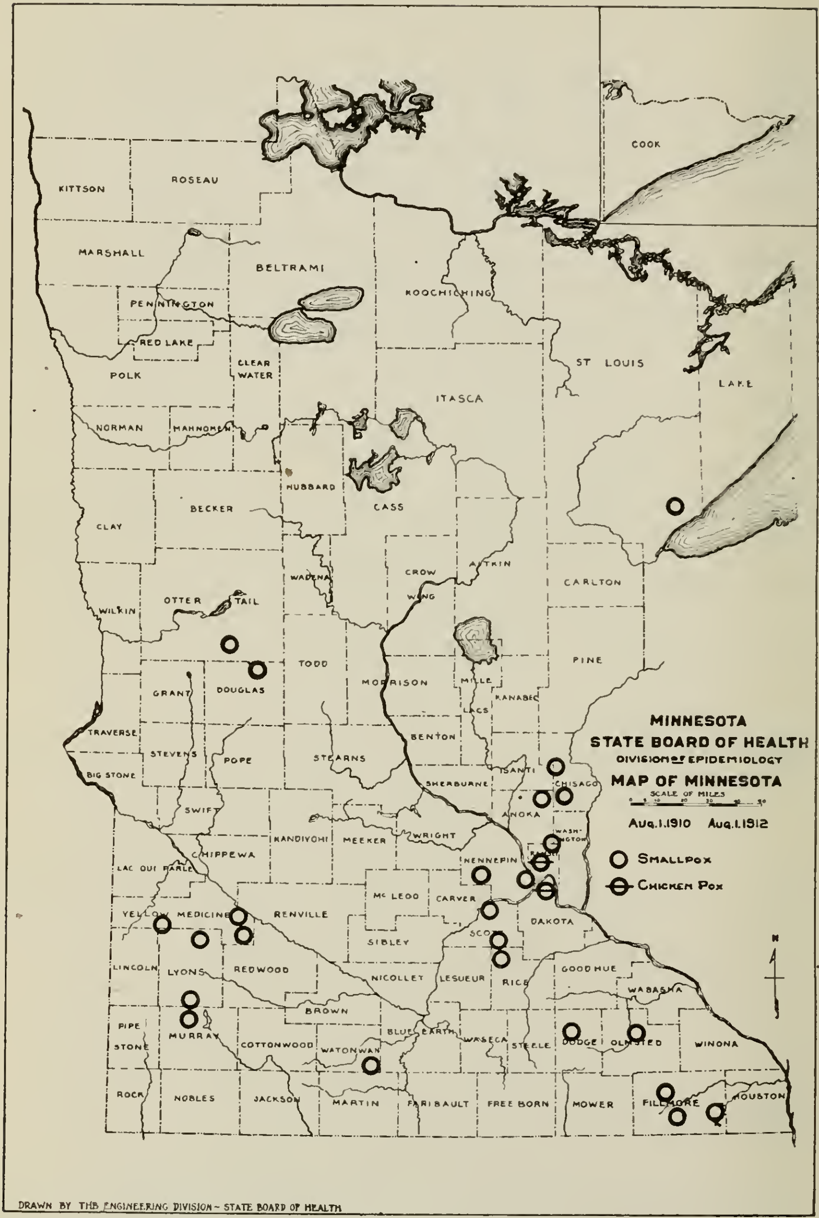
BY A. J. CHESLEY.

Request of health officer.

Reason—A rural mail carrier had gone about his route with red spots on his face and hands, people believed he had smallpox instead of chickenpox as he claimed.

History—Adolph B.—— is thought to have contracted smallpox in the Twin Cities and to have been the first case at Tracy. Following the cases in his family, a number of families were affected and a physician saw some of the light cases at such a stage that he believed the disease to be chickenpox. Few people were protected by vaccination and the disease spread rapidly.

Inspector, with Dr. Zeien, visited the mail carrier's and Geo. B.'s families. Cases were unquestionably smallpox. The mail carrier showed many deep seated,



See List on Page 275.

mahogany plaques in his palms; his face, hands and arms still had some scabs. Instructed him to dig out plaques, clean off all scabs, etc., employ a substitute carrier until he could be released from quarantine. Advised him to report the circumstances of his work and sickness to postoffice inspector for instructions, regarding disposal of stamp books, etc., handled during his sickness. February 20 visited school district No. 11. Teachers Miss Olive D.——, twenty-one, never successfully vaccinated; Miss J. E. L.——, twenty-three, vaccinated eight years ago; one hundred and seven enrolled, seventy-one present, three vaccinated, forty-seven had recently had smallpox. All others unvaccinated and exposed, children had returned to school when prodromes were over and remained in school throughout eruptive stage. Found smallpox in families near Tracy Henry W.——, Simon M.—— and E. C. W.——. (E. C. W.——, fifty-seven, and Francis W., twenty-two, rural carriers, show good scars, but were advised to be revaccinated.) Did not have time to visit several families having smallpox now or recently.

Result—Diagnosis is smallpox. Town board appointed Dr. Zeien, health officer. School board will issue vaccination order or close school. Health officer will follow up families where cases exist or have existed, vaccinate exposed persons, supervise disinfection, etc. School board and town board seem willing to do their parts. The public is to blame for the epidemic because vaccination has been neglected in spite of Dr. Zeien's advice at the time of his wholesale vaccination of school children in North Branch. In certain families the only vaccinated children were those who attended high school at North Branch and had been vaccinated there by Dr. Zeien.

Inspector left Minneapolis 2:00 p. m., arrived North Branch 3:50 p. m., February 19, 1912. Left Stacy 1:30 p. m., for Linwood township, Anoka county.

SUMMARY.

Smallpox, Custer Township, Lyon County; Lake Sarah Township, Murray County; July 25, 26, 27, 1912.

DRS. GEO. GEIST AND A. J. CHESLEY.

Request of Mr. H. D. Morgan, chairman board of supervisors, Custer township, Lyon county.

Reason—About 75 per cent of the population between Lake Shetek and Cottonwood River had been exposed to smallpox. About twenty cases were known to the chairman board of supervisors. Advice and assistance desired.

History—Postmaster's family at Garvin was the first known to have had smallpox. Allen J., twenty-two, never vaccinated, conductor St. Louis Park car line, Minneapolis, came home in April, sick. It is thought that he had a typical smallpox. No physician was called, although Mrs. E. M. J., thirty-two, developed smallpox May 19th, and Margaret, thirteen; Mable, seven; Myrtle, seven months, on June 10th. The clerk, Ella D., twenty, developed smallpox July 1st. None had been vaccinated. Dr. W. H. Valentine quarantined her at W.'s house, inspected J. family, disinfected postoffice and store. General exposure occurred at Garvin postoffice, at Marshall during the Chautauqua week, especially July 11th, when Hon. W. J. Bryan made a speech. Also at the "Iowa picnic" held at Tom D.'s, Lake Shetek, Murray county, July 5th.

Inspectors, with chairman board of supervisors of Custer township, visited all known or suspected smallpox families in Custer township, Lyon county, and Lake Sarah township, Murray county; telephoned to Dr. C. Germo, health officer, Balaton; Justus England, chairman board of supervisors, Rock Lake township; Geo. Ossen, chairman board of supervisors, Lyon township; Chas. Ford, chairman board of supervisors, Sodus township; David Morgan, chairman board of supervisors, Amiret township, Lyon county; and John J. Furen, chairman board of supervisors, Lake Sarah township; Peter Johnson, chairman board of supervisors, Skandia township; J. W. Averill, chairman board of supervisors, Shetek township, Murray county. Saw E. Evans, chairman board of supervisors, Monroe township, Lyon county, and Dr. W. H. Valentine, health officer, Tracy city, and Dr. C. G. Bacon, health officer, Marshall city, but they knew of no other cases or suspects.

Results—Thirty-three cases were examined in nine families in Custer township, Lyon county. Ten cases were examined in four families in Lake Sarah township, Murray county. Instructions and advice were given to the officials, some of whom did not know the regulations or how to handle smallpox. Vaccination was urged strongly and many persons acted upon the advice. Drs. Valentine and Germo arranged to vaccinate in the townships all who applied. Health officers of surrounding territory were notified to watch for suspicious cases particularly during harvest and report.

Inspectors left Minneapolis 9:30 a. m., arrived Garvin 4:30 p. m., July 25th. Left Tracy 4:15 p. m. Arrived Marshall 5:00 p. m., July 26th. Left Marshall 12:00 m., arrived Minneapolis 6:00 p. m., July 27, 1912.

SUMMARY.

Smallpox, Rochester City, Olmsted County, May 6 and 12, 1911 (Two Trips).

BY A. J. CHESLEY.

Request of Dr. R. W. Shumway, secretary Michigan State Board of Health.

Reason Mose J. had left Rochester in the active stage of smallpox and proceeded by train to Crystal Falls, Michigan, thereby exposing people to smallpox during the journey.

History—Mose J. arrived in Rochester April 19th, was examined by Drs. Griffin and Plummer, April 25th. Diagnosis of smallpox was made and written and telephonic report given the health officer. The health officer by agent investigated the case and placarded the house, but permitted the patient to take train April 25th, P. M., for Michigan.

Inspector interviewed the health officer, Drs. J. Z. Griffin and C. H. Mayo, Mrs. E. R. T., at whose house the patient boards, and Mr. W. R. Pattinson, acting inspector Rochester board of health, and obtained data.

Results—Data show that patient was permitted, but not compelled by the health officer to leave Rochester; that Dr. Giffin properly reported to the health officer; that the report was torn up and thrown away and not sent to the State Board of Health, but that some of the pieces were recovered and given the inspector by Dr. Adams, May 7th. The executive officer consulted the attorney general, then ordered inspector to return to Rochester and lay the evidence before the county attorney, which was done May 12th.

Inspector left Fountain 5:00 p. m., arrived Rochester 9:30 p. m., May 6, 1911. Left Rochester 7:00 a. m., arrived in Minneapolis at noon, May 7, 1911. Left Minneapolis 8:00 a. m., left Rochester 9:07 p. m. for Austin.

SUMMARY.

Smallpox, Wood Lake Village and Township, Sioux Agency and Posen Townships, Yellow Medicine County, and Lucas Township, Lyon County, May 20-22, 1911.

BY A. J. CHESLEY.

Request—Postmaster of Wood Lake and others.

Reason—Boards of health were in doubt as to their authority and duties and had done nothing to prevent the spread of smallpox.

History—Smallpox reported in Lyon county early in the winter. It was called chickenpox by some physicians. Question of diagnosis was settled by inspector February 11, 1911. However, the town boards neglected their duties and smallpox spread rapidly. Dr. Robertson, of Cottonwood, and Dr. Moore, of Wood Lake, made the correct diagnosis right along. Dr. Thoraldson at first was uncertain but later concurred in the diagnosis of smallpox. Dr. J. T. Gill, of Echo, did the same. Few families employed physicians. No medical health officers had been employed by town boards to investigate suspected cases.

Inspector interviewed members of boards of health; made investigation in Wood Lake, Sioux Agency and Posen townships, Yellow Medicine county; Lucas township, Lyon county. Finally wrote local authorities enclosing laws and regulations, etc., with advice. Number of cases involved in this epidemic would probably total about 350. Only four families had been quarantined. Inspector examined forty-seven cases and heard of many others.

Result—Local officer's misunderstanding about their authority and duties in smallpox was corrected. Proper measures were advised. Public indifference toward mild smallpox and the general ignorance about the efficiency of vaccination was combatted in the local paper and by distribution of laws, regulations and the U. S. P. H. and M. H. S. bulletins and reprints on smallpox and vaccination.

Inspector left Minneapolis 8:30 a. m., arrived in Wood Lake 1:40 p. m., May 20, 1911. Left Wood Lake 8:30 a. m., for Atwater via Granite Falls.

SUMMARY.

Smallpox, Rice Lake Township, St. Louis County, June 22 and 23, 1911.

BY A. J. CHESLEY.

Request of Duluth health department.

Reason—Dr. Murphy arrested in Duluth a resident of Rice Lake township, who came to the city in the active stage of smallpox. Upon investigation, Dr, Murphy learned that smallpox had been prevalent about Arnold postoffice since December, 1910.

History—Ernest F. was taken home to Rice Lake township, from the house of Mrs. Mary R. (who had smallpox in Duluth and was taken to the Isolation hospital January 1, 1911). This fact was concealed from the authorities and smallpox developed in the F. family. Upon complaint of citizens the chairman board of supervisors employed a doctor to inspect the family. He said there was no smallpox at F.'s. Apparently this was the primary source of the smallpox infection in Rice Lake. A teacher, the majority of the school children (numbering about one hundred and forty), many adults and young children developed smallpox. Certain families were quarantined upon the order of Dr. Boyer. Mild cases were called "chickenpox" by physicians. The supervisors, although not well informed about their duties, acted in good faith but with poor judgment. The inspector with Dr. Murphy visited ten families in Rice Lake township and found forty-two cases.

Results—Arrangements were made for a house to house investigation and free vaccination of all who applied. Dr. Murphy was recommended to the board for this investigation. Full report will be made by him. Letters from the executive officer to certain physicians apparently responsible for mistakes were outlined.

Inspector left Minneapolis 9:30 p. m., arrived in Duluth 2:00 p. m., June 22, 1911. Left Duluth 11:00 p. m., June 23, 1911, arrived in Minneapolis 6:00 a. m., June 24, 1911.

SUMMARY.

Chickenpox Complicated with Scarlet Fever and Possibly Smallpox, St. Paul City, Ramsey County, January 29, 1912.

BY H. W. HILL.

Request of Dr. C. N. Hensel, medical inspector St. Paul Department of Health.

Reason—Question of diagnosis, chickenpox established, but uncertainty as between scarlet fever and prodromal rash of smallpox, also question of existence of smallpox.

History—Marion C. F——, F. 7½, first sick evening of January 24; no rash, face pale (had been "dumpish" for a day or two previous); January 25, chilly, stayed at home, no rash; January 26, red rash and eruption in spots found first thing in the morning. Rash on chest and face, spots on body and face, seen by Dr. R. O. Earle and diagnosed chickenpox: turned over to Dr. Hensel, with question as to further diagnosis of rash. Prodromal rash of smallpox was later suspected. Patient's premises placarded "Smallpox" January 28. January 28 "small spots" came out on forehead and hands. These contrasted in size with the now "large," i. e., fully developed original chickenpox lesions. The patient had had measles, but not scarlet fever, chickenpox, smallpox, diphtheria, mumps, etc. Never vaccinated. Rather indefinite history of exposure to a recently released scarlet fever case within incubation period.

Inspector found clear cut chickenpox of several days standing corresponding in age with the history of eruption on January 26. Also rash, enlarged glands, temperature and typical tongue and throat of scarlet fever. Also numerous soft, scarcely palpable small vesicles on forehead corresponding with a second crop of chickenpox vesicles, if appearing, as happens, on alternate day following first crop. The lesions on hands and feet are indistinguishable from chickenpox lesions. It is well known that the differences between chickenpox and smallpox on the hands and feet are often not great.

Result—Chickenpox and scarlet fever co-existent. Existence of smallpox strongly questioned, but not absolutely eliminated. Smallpox card left up, to meet possible development of smallpox. Subsequent statement by Dr. Hensel, February 7, 1912: Child developed impetigo in chickenpox lesions and is now desquamating in intermediate areas. Suspected smallpox lesions finally proved to be chickenpox, second crop. Inspector's diagnosis confirmed on every particular. Smallpox sign taken down February 3, 1912. (A second typical case of smallpox in another family was incidentally seen also with Dr. Hensel.

Inspector left Minneapolis about 1:30 p. m., returning, leaving St. Paul, about 4 p. m.

TRACHOMA, TUBERCULOSIS, POLIOMYELITIS, LEPROSY.

Trachoma—Surgeon General Rupert Blue, of the United States Public Health Service, detailed Dr. Taliaferro Clark, a well known trachoma expert, at the request of the State Board of Health, to make preliminary survey in conjunction with the Division of Epidemiology in locations where trachoma was reported to be spreading.

The summaries show the conditions discovered in this hasty restricted investigation. Dr. Clark recommended that a thorough survey should be made to determine the exact prevalence of the disease. Acting upon his advice the board requested assistance again from the United States Public Health Service for this purpose. Through the courtesy of the surgeon general, Dr. Clark will be available for this work in the spring of 1913.

Tuberculosis—The first field work was done in 1911. Its reception locally was most gratifying, and more work of this character will be done as circumstances permit. Two things are absolutely essential for successful tuberculosis work. First the **open cases must be found**, for they are the ones who spread the disease; second, the **open cases must be supervised**, for their own welfare and, more important, as a protection to the public. The first part is not difficult. Much could be done with our present means alone, but there **is no use in finding cases when no place has been provided for their care and supervision.** Tuberculosis is a simple problem from the epidemiologist's standpoint, only the public indifference and neglect in regard to open cases when found, make his efforts valueless, except perhaps as they may assist in the education of the people to a proper appreciation of the situation.

Poliomyelitis—Relatively few cases of this disease have been reported during this biennial period. Several investigations were made, but nothing new was discovered, since the epidemiological studies of the previous years had been very painstaking and thorough.

Leprosy—The public ought to know the facts about leprosy. The victims of this disease suffer enough without being persecuted or neglected. If truth should eventually overcome prejudice, some adequate provision may be made to suppress tuberculosis, the most common and dangerous of infectious diseases in Minnesota, and a few thousand dollars may be spent to provide comfortably for the few cases of leprosy, a rare and relatively innoxious disease.

LIST OF INVESTIGATIONS.

TRACHOMA, TUBERCULOSIS, POLIOMYELITIS, LEPROSY AND MISCELLANEOUS TRIPS.

Twenty-six trips as listed below, were made covering territory in nineteen counties. The field work required fifty-three days. No reports or summaries for investigations made between August 1, 1910 and January 1, 1911, are included since this work was covered in the first report of this division:

TRACHOMA.

With Dr. Taliaferro Clark, Surgeon, United States Public Health Service.

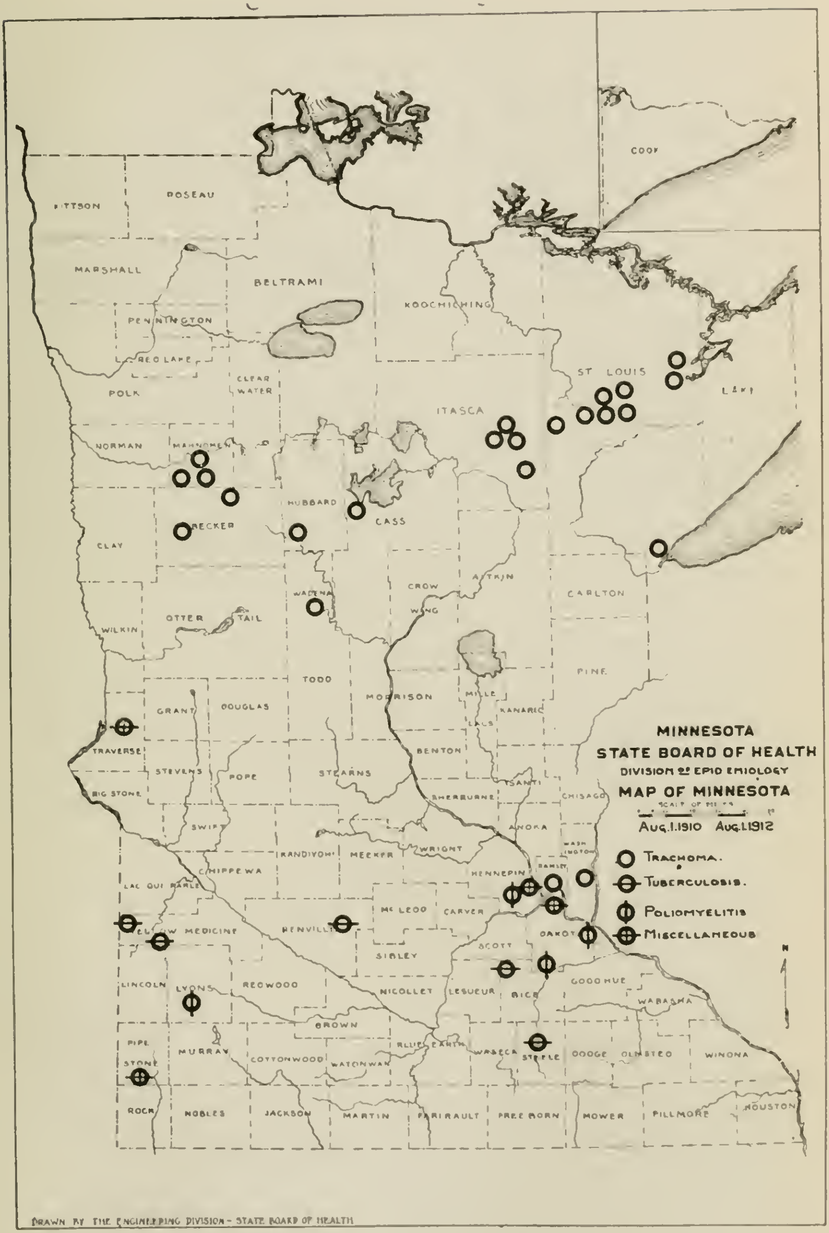
Leech Lake and White Earth Indian Reservations and Vicinity.

County.		Township, Village, City.	Date.
Becker		Carsonville township	**May 6-15, 1912
	(H)	Detroit city	
		Pine Point	
Cass	(H)	Leech Lake agency	
		Walker village	
		Onigum village	
Hubbard	(H)	Park Rapids city	
Mahnomen	(H)	Beaulieu village	
		Waubon village	
		White Earth agency and vicinity	
		Mesaba and Vermillion Iron Ranges.	
Itasca	(C)	Bovey village	**May 15-27, 1912
		Coleraine village	
		Taconite village	
		Marble village	
St. Louis	(C)	Hibbing village	
		Chisholm city	
		Virginia city	
		Eveleth city	
		Gilbert village	
		Biwabik village	
		Ely village	
		Duluth city	
		Tower (Indian School)	
		TUBERCULOSIS.	
Renville	(H)	Hector village	January 22, 1912
Rice	(C)	Wheatland township	February 6-7, 1912
		Webster township	
		Erin township	
		Forest township	
Steele	(C)	Owatonna city	February 2-3, 1912
Yellow Medicine	(H and C)	Porter village	Dec. 27-28, 1911
	(H and C)	Canby village	April 2-3, 1912
		POLIOMYELITIS.	
Dakota	(H)	Hastings city	August 26, 1910
	(H)	Waterford township	October 15, 1910
Hennepin	(H)	Bloomington township	September 3, 1910
Lyon	(H)	*Tracy city	**August 29-31, 1910
		LEPROSY.	
Mille Lacs	(H and C)	South Haven township	Sept. 18-20, 1911
Ramsey	(H)	St. Paul city, County Poor Farm	January 27, 1911
Washington	(H)	Stillwater city	November 2, 1910
		MISCELLANEOUS.	
Dakota	(H)	South St. Paul city, purpura hemorrhagica	December 12, 1911
Hennepin	(H)	Minneapolis city, non-specific infection	February 15, 1912
Pipestone	(C)	Ruthton village	June 7-8, 1911
Traverse	(C)	Wheaton village, Muslinka ditch trail	January 19, 1912
Wadena	(H)	Wadena village, dairy inspection	October 9, 1910

C=Dr. A. J. Chesley. H=Dr. H. W. Hill.

*Another communicable disease investigated at same time.

**Dates appear in two different places, but days are counted but once.



DRAWN BY THE ENGINEERING DIVISION - STATE BOARD OF HEALTH

SUMMARY.

Trachoma, White Earth and Leech Lake Reservations and Vicinity, May 6 to 15, 1912.

DR. TALIAFERRO CLARK, SURGEON, U. S. P. H. AND M. H. S.

DRS. R. H. MULLIN AND H. W. HILL.

By order of the executive officer, State Board of Health, and Surgeon General, United States Public Health and Marine Hospital Service.

History—Rumors, official reports and general agitation concerning condition of Indians, together with an alleged change in status of Indians from that of wards of the federal government to that of wards of the state, required the determination of the facts by the State Board of Health preliminary to planning appropriate action.

Inspector—Dr. Clark, making diagnosis, studied the situation in and about the White Earth and Leech Lake Reservations at Park Rapids, Pine Point, Mahnomen, Beaulieu, Waubun, White Earth Agency, Detroit, Walker, Leech Lake Agency, Onigum and vicinities, interviewing physicians, officials, etc. examining eyes of Indians, mixed bloods and whites, especially in schools and collecting such official records and publications, etc., as seemed to bear on the situation. Eyes were examined as follows:

Total persons examined	2,021
Trachoma cases found	190
Suspected trachoma	17

Results—The existence of trachoma in the places investigated was established. Great prevalance of trachoma amongst full-blood Indians, considerable amongst mixed bloods, and comparative scarcity amongst whites was established. No evidence was found of **great immediate danger of infection of whites not on the reservations.** The rights and duties of the State Board of Health towards the Indians was found to be a question practically unsolvable at present, and varying with the political status of the Indians, which in turn varies according to the particular location of each Indian, his degree of blood (full-blood or mixed), his age (minor or adult) and probably other factors. (See detailed reports and exhibits of May 16 and June 26, 1912.)

Left Minneapolis 9:05 a. m. by Great Northern, for Park Rapids, returning May 15, 1912, from Walker, by Northern Pacific.

SUMMARY.

Trachoma, Mesaba and Vermillion Iron Ranges, St. Louis and Itasca Counties, May 15-27, 1912.

DR. A. J. CHESLEY, ASSISTING DR. TALIAFERRO CLARK, SURGEON, U. S. P. H. and M. H. S.

By order of executive officer, State Board of Health, and Surgeon General, United States Public Health and Marine Hospital Service.

Reason—Report of spread of trachoma amongst school children.

History—Surgeon General, U. S. P. H. and M. H. S. detailed Dr. Clark, trachoma expert for a preliminary investigation of trachoma in Minnesota at request of State Board of Health.

Inspector assisted Dr. Clark, who investigated the prevalence of trachoma as follows: Duluth, May 16, interviewed Health Department, Medical Supervisor of Schools, United States Immigration Officer, Acting Assistant Surgeon U. S. P. H. and M. H. S. and several eye specialists. No cases were found. Examinations were made as follows:

	May	Pupils	Trachoma	Miners	Trachoma
Hibbing	17-18	1,168	(2+, 2?)	710	(8+, 4?)
Coleraine	19-20	205	....	93	(3+, 2?)
Bovey	19-20	143	....	66	(4+, 0?)
Taconite	20	771	....	.....	....
Marble	20	130	....	65	(7+, 0?)
Chisholm	21	1,064	(2+, 1?)	1	(1+, 0?)
Virginia	22 and 24	1,747	(3+, 1?)	310	(7+, 4?)
Eveleth	23	1,315	....	.....	....
Gilbert	24	573	....	1	(1+, 0?)
Biwabik	24	465	(3+, 0?)	73	(3+, 1?)
Ely	25	.....	....	392	(0+, 0?)
Tower Indian Sch.	25	83	....	.....	....
Miscellaneous (4):					
Bovey	19	2	(2+, 0?)	.....	....
Ely	25	2	(2+, 0?)	.....	....
		6,968	(14+, 4?)	1,711	(34+, 11?)

The health officers, school supervisors and physicians in these places were interviewed and notes made from their records of trachoma cases and of the general prevalence of the disease. The success of the investigation is largely due to the co-operation of these gentlemen, of the officials of local and government schools and of the mining companies, especially the Oliver Iron Mining Co.

Results—Infectious trachoma cases were seen in every range town visited except two (Taconite and Eveleth) where no miners were examined. Local practitioners report that some cases exist amongst miners in practically every group of mines. At present no control or official supervision obtains except that school children with the disease are excluded from school and miners affected are discharged or laid off and treated as long as they will come for treatment.

Left St. Paul May 15, 11 p. m. Returned Minneapolis May 27, 1912.

SUMMARY.

Tuberculosis, Wheatland, Webster, Erin and Forest Townships, Rice County, February 6-7, 1912.

BY A. J. CHESLEY.

Request of members of families concerned.

Reason—Many deaths from tuberculosis during last eight years in these townships, and active cases existing led to correspondence and lecture by Dr. Hill and investigation by Dr. Chesley.

History—Twenty-one deaths in 11 families in 9 years. Nine families now have open cases or suspected latent cases.

Inspector interviewed Dr. F. L. Lexa and Father Bouska **re** families to be visited.

S. 36, Wheatland township, Ole J——— (5 deaths). Living and well, Ole, m., 75; Mrs., 67; Ole, Jr., 29; Ole F——— (1 death). Ole, 44, suspected case; Marian, 13, sick two years ago, well now; Laura, 11; Johannes, 7; Oscar 3, were well.

S. 31, Webster township, Ole H——— (3 deaths). Carrie, 30, suspected case; coughing two months, objected to examination; Ole, 62; Mrs., 60, well. B. T——— (2 deaths). Ben, 50; Mrs., 45; Ben, Jr., 22; Emma, 19, apparently well. C. P———. Pete, 52, asthma and bronchitis 3 years, temp. N.; Mrs., 51, open case; Arthur, 21; Carl, 18; Henry, 13; Geo., 10, seem O. K. Corde f. 15, had poliomyelitis, August, 1910. Johannes B———. Ella, 26; (Mrs. W.), open case, recovering under supervision of Dr. Hart, of Duluth; Johannes, 47; Mrs., 70; Ole, 21, were well.

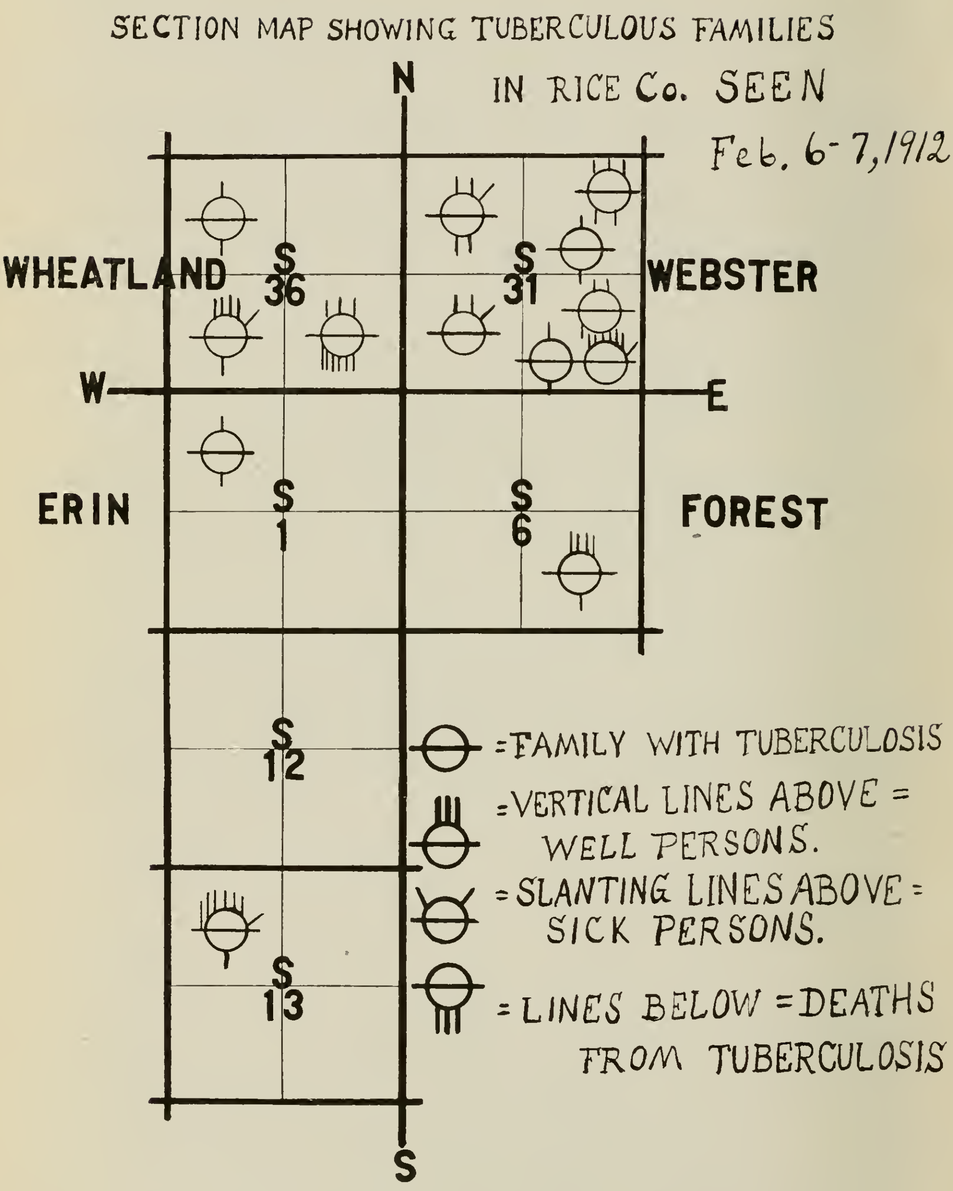
S. 13, Erin township, Frank S——— (1 death). Mike, 78; Mrs., 53; Frank, 36; Mrs. F., 34, and 2 girls, 4 and 5 years, were well; Jas., 24, open case.

S. 6, Forest township, Ole V——— (1 death). Ole, 70; Mrs., 54; Emil 23 and Tom, 17, were well.

For details of patients' condition and sanitary environment see notes. Deaths have occurred in 6 other families, but no cases now exist at their homes. Certain patients are in Colorado for treatment.

Results—Only one person asked for physical examination, an open case under a physician's care. One family refused permission to see patient. Other families seemed anxious to follow directions and were trying to handle cases properly. Mrs. W——— has ideal care, although family is very poor. She was taught, through Duluth Anti-tuberculosis Society, how to care for herself. Need of sanatorium treatment and education is apparent. Family isolation cannot be trusted without such education previously.

Inspector left Minneapolis 11:25 a. m.; arrived Lonsdale, 1:20 p. m., February 6; left Lonsdale, 9:30 p. m.; arrived Minneapolis, 11 p. m., February 7, 1912.



SECTION MAP SHOWING TUBERCULOUS FAMILIES IN RICE Co. SEEN Feb. 6-7, 1912

N
WHEATLAND
S 36
S 31
WEBSTER
W
E
ERIN
S 1
S 6
FOREST
S 12
S 13
S
=FAMILY WITH TUBERCULOSIS
=VERTICAL LINES ABOVE = WELL PERSONS.
=SLANTING LINES ABOVE = SICK PERSONS.
=LINES BELOW = DEATHS FROM TUBERCULOSIS

(Old forms used before August 1912)

DISEASES TO BE REPORTED

Anterior poliomyelitis
Cerebro-Spinal-Meningitis
Chicken Pox
Diphtheria
Glanders (Human)
Leprosy
Measles
Scarlet Fever
Small Pox
Trachoma
Tuberculosis
Tyhpoid Fever

A Separate Card Must Be Made Out for Each Person

REPORT OF TRANSMISSIBLE DISEASES

(To be made by attending physician or other persons to the local health officer)

To the local health officer of .... County of............
(Township-Village-City)*

There is a case of...................... in your.......................
(Give name of disease) (Township-Village-City)*

Name of patient........................ Residence....................

Age........ Sex.......... Source of infection..........................

Date of first symptoms............. If smallpox, date of last successful vaccination.................................. If diphtheria amount of antitoxin used .... Date first laboratory exam'n.................

Name attend. phys. or other reporter...................................

Date................... 191... Address..........................

This blank is to be filled out by the health officer or chairman of local board of health and the whole card then forwarded to the Secretary State Board of Health, St. Paul, Minn.

The above report was received........................ 191..

The place was quarantined.... .... 191 .

(If supplies are wanted) Please send........ ....

Signed.............................. Date............. 191..
(Health Officer or Chairman Local Board of Health)

of......................... Adrress.......................
(Township-Village-City)*

NOTE: Place name of disease in proper blank line of reporting side of card.

Form I

*Strike out words which do not apply.

REPORT OF RELEASE OF QUARANTINE

This must be returned promptly by the local Health Officer to the Minnesota State Board of Health.

I hereby report that the last case of......................................
(Name Disease)

which appeared in the family of...

on........................., and was quarantined..........................
(Give date) (Give date)

has recovered and was released from quarantine.......................... under the
(Give date)

instructions of...
(Give name of party authorizing release)

Was disinfection carried out in accordance with Circular No. 61, of the State Board of Health?

....

By.................................
Dr. or Mr.

(Signed)..
(H. O. or C. B. S.)

of.................................... ....
(Township-Village-City) (County)

Form II

(Forms in use since August 1912)

Form 1-A

AS REQUIRED BY PUBLIC HEALTH LAW I REPORT TO THE HEALTH OFFICER A CASE

*Township
Of .... in the Village of .... in .... Co.
(*Name of disease*) City (*Name of place*) (*Name of county*)

At ....
(*Give street and house number, name and location of hospital, farm, camp, etc.*)

Patient's name .... Sex .... Age ....
(*Give full name, and for a child, parent's initial or guardian's name*)

Date of first symptoms .... 19. . of diagnosis .... 19 . of report .... 19. .
(*Month day*) (*Month-day*) (*Month-day*)

Signed: Dr .... of .... Minn.

MAKE A CARD FOR EACH CASE OF:

Anterior poliomyelitis
Cerebro spinal meningitis
Chickenpix
Diphtheria
Glanders (Human)
Leprosy
Measles
Ophthalmia neonatorum
Scarlet Fever
Smallpox
Trachoma
Tuberculosis
Typhoid Fever

The H. O. or C. B. S. should fill out the blanks below and mail this report to
DIVISION OF EPIDEMIOLOGY STATE BOARD OF HEALTH.
UNIVERSITY CAMPUS, MINNEAPOLIS, MINN.

*Quarantined
I received this report .... 19. . and Isolated .... 19. . .
(*Month-day*) Placarded (*Month day*)

Please send me ....
(*Name what supplies are needed*)

*M. D. Health Officer
Signed .... Chairman Bd. of Super'v's

*Township
For .... Village, P.O.Address ....
City

*Strike out words which do not apply.

Form I-B.

AS REQUIRED BY PUBLIC HEALTH LAW I REPORT TO THE HEALTH OFFICER A CASE

*Township
Of **SMALLPOX** in the Village of .... in .... Co.
(*Name of disease*) City (*Name of place*) (*Name of county*)
At ....
(*Give street and house number, name and location of hospital, farm, camp, etc.*)
Patient's name .... Sex .... Age ....
(*Give full name, and for a child, parent's initial or guardian's name*)
Date of first symptoms .... 19. . of diagnosis .... 19. . of report .... 19. .
(*Month-day*) (*Month-day*) (*Month-day*)

Additional data required by U. S. PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE for cases of

Small Pox
*(A) Successfully vaccinated within seven years
Case is *Virulent in type. Patient was (B) Successfully vaccinated over seven years ago
Benign (C) Never successfully vaccinated
(D) Unable to give definite history of vaccination

Signed: Dr .... of .... Minn.

MAKE A CARD FOR EACH CASE OF:

Anterio poliomyelitis
Cerebro spinal meningitis
Chickenpox
Diphtheria
Glanders (Human)
Leprosy
Measles
Ophthalmia neonatorum
Scarlet Fever
Smallpox
Trachoma
Tuberculosis
Typhoid Fever

The H. O. or C. B. S. should fill out the blanks below and mail this report to
DIVISION OF EPIDEMIOLOGY STATE BOARD OF HEALTH
UNIVERSITY CAMPUS, MINNEAPOLIS, MINN.

*Quarantined
I received this report .... 19. . and Isolated .... 19. .
(*Month-day*) Placarded (*Month-day*)

Please send me ....
(*Name what supplies are needed*

*M. D. Health Officer
Signed .... Chairman, Bd. of Supervisors

*Township
For .... Village, P. O. Address ....
City

*Strike out words which do not apply.

(Forms in use since August 1912)

Form II-A.

AS REQUIRED BY PUBLIC HEALTH LAW I REPORT THE RELEASE OF QUARANTINE

For .... **in the** ***Township** **Village** **City** **of** .... **in** .... **Co.**
(*Name of disease*) (*Name of place*) (*Name of county*)

At ....
(*Give name and house number, name and location of hospital, farm, camp, etc.*)

In the family of ....
(*Give name of householder or head of family*)

The last case appeared .... **19** **Was quarantined** .... **19** **Released** .... **19..**
(*Month day*) (*Month-day*) (*Month day*)

Upon authority of .... **of** .... **Minn.**
(*Name and address of person authorizing release*)

Disinfection was done by .... **of** .... **Minn.**
(*Name and address of person authorized to disinfect*)

***According to State Board of Health Disinfection Circular No. 61 or**

as follows: ....
(*Describe method if different from that given in Circular No. 61*)

Signed: .... ***M. D., Health Officer** **Chairman, Bb. of Supervisors**

For .... ***Township** **Village** **City** **P. O. Address** .... **Minn.**

***Strike out words which do not apply.**

Form III.

(Cases of DIFFERENT diseases should NOT be reported on the same sheet)

(Use Special SMALLPOX Sheet for SMALLPOX Cases)

Cases of .... in .... from .... 19.. to .... 19..
(*Name of Disease*) (*Name of City*)

Reported to MINNESOTA STATE BOARD OF HEALTH. .... 19..

Signed .... Health Commissioner

Do NOT Report Smallpox on this sheet.

Patient's Name	Age	Sex	Date of First Symptoms	Date Seen First by Physician	Date of Physician's Report	Attending Physician

Form IV.

SPECIAL SMALLPOX SHEET

Cases of Smallpox in .... from .... 19 to .... 19..
(*Name of City*)

Reported to MINNESOTA STATE BOARD OF HEALTH 19

.... Signed ....
Health Officer.

Patient's Name	Age	Sex	Date of First Symptoms	Date seen first by Physician	Date of Physician's Report	Smallpox		Successfully Vaccinated			
						Benign B Virulent		A Less than 7 yrs. ago	B More than 7 yrs. ago	C Never	D No data
						B	V				

No. 74-4-4-1911-5000.

Form V

MINNESOTA STATE BOARD OF HEALTH—AGE AND SEX SHEET

Disease ....

Male

Age	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Under 1													
1 to 4													
5 - 9													
10 - 14													
15 - 19													
20 - 24													
25 - 29													
30 - 34													
35 - 39													
40 - 44													
45 - 49													
50 - 54													
55 - 59													
60 - 64													
65 - 69													
70 and over													
Total													
Deaths													

Female

Age	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Under 1													
1 to 4													
5 - 9													
10 - 14													
15 - 19													
20 - 24													
25 - 29													
30 - 34													
35 - 39													
40 - 44													
45 - 49													
50 - 54													
55 - 59													
60 - 64													
65 - 69													
70 and over													
Total													
Deaths													

No. 74-10-1-09 2 M.
Form VI.

MINNESOTA STATE BOARD OF HEALTH—SOURCE AND RELEASE SHEET

DISEASE ....

Initial Reported by	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
H. O.													
Lab.													
Death Ret													
Phys.													
News.													
Total													

Released by	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Time													
Lab.													
Total													

Form VII.

MINNESOTA STATE BOARD OF HEALTH
DIVISION OF EPIDEMIOLOGY

July 18th, 1912.

Dr. H. M. Bracken,
Secretary and Executive Officer,
State Board of Health,
Capitol, St. Paul, Minnesota.

Dear Doctor Bracken:—

In accordance with the resolution adopted at the Conference of State and Territorial Health Authorities of the United States with the Public Health and Marine Hospital Service at Washington, June 1st, 1912, I respectfully submit a statement regarding the prevalence and geographic distribution of certain diseases in Minnesota.

1. Prevalence of Notifiable Diseases, June, 1912.

A. Conference List.

Smallpox:—*Vaccination classification Total

(a) ____________ (b) ____________ (c) ____________ (d) ____________ ____________

Leprosy .... ________
Scarlet Fever .... ________
Measles .... ________
Diphtheria .... ________
Typhoid Fever .... ________
Poliomyelitis .... ________
Cerebro Spinal Meningitis (epidemic) .... ________
Dysentery .... ________
Spotted Fever (Rocky Mountain) .... ________

B. Other diseases included in State List—
Chickenpox .... ________
Glanders (Human) .... ________
Ophthalmia Neonatorum .... ________
Rabies (Human) .... ________
Tuberculosis .... ________
Trachoma .... ________

*(a) Those who were successfully vaccinated within 7 years.
(b) Those who were successfully vaccinated over 7 years ago.
(c) Those who were never successfully vaccinated.
(d) Those who have no definite history of vaccination.

Form VIII

II. Geographic Distribution of Notifiable Diseases June, 1912.

VACCINATION DATA

SMALLPOX	(A) Less than 7 yrs. ago	(B) More than 7 yrs. ago	(C) Never	(D) No Data	Cases
Blue Earth Co	....	....	....	....	....
Mankato City	....	....	....	....	....
Amboy village	....	....	....	....	....
Beauford township	....	....	....	....	....

Leprosy ....
Scarlet Fever ....
Measles ....
Diphtheria ....
Typhoid Fever ....
Poliomyelitis ....
Cerebro Spinal Meningitis (epidemic) ....
*Dysentery ....
*Spotted Fever (Rocky Mountain) ....
Glanders (human) ....
Ophthalmia Neonatorum ....
Rabies (human) ....
Tuberculosis ....
Trachoma ....

(Note. All diseases are tabulated under County and Sanitary District i. e.. Township Village, City.)

*Dysentery and Soptted Fever are not notifiable in Minnesota.

This report was compiled July 18th, 1912. It includes all cases of the diseases in which the first symptoms appeared or upon which final diagnosis was made in June.

Respectfully submitted,
Director, Division of Epidemiology.

Form IX.

SCHEDULE

OF LOSSES FROM CLOSING SCHOOLS ON ACCOUNT OF EPIDEMICS

In__________________________County

District School House	Number of Children Excluded	Number of Teachers Excluded	For What Disease Was Closing Done	Length of Time Closed	Estimated Direct* Financial Loss to School District

Date________________19__ (Signed)__________________________

Address__________________________

*This direct financial loss would include teachers' and janitors' salaries and such other running expenses as are not suspended by closing the school. These losses would be more or less offset by lessened fuel and lighting bills, etc., i. e., expenditures suspended during the closure of school. Indirect losses, due to setting back the progress of the school course, pupils' loss of time, etc., are not to be considered here, but an additional note on these disadvantages may be added separately.

Please return schedule when filled out to Dr. H. W. Hill, Director, Division of Epidemiology, Minnesota State Board of Health, Minneapolis, Minn.

Form X.

1 .... 2 ....
1 Family Name 2 Given name in full

3 .... Minn.
3 Address while attending school in Minnesota

*Strike out words which do not apply

4 HOME ADDRESS {Township / Village / City} of ....

COUNTY OF .... STATE OF ....

5 DATE OF BIRTH .... 6 PLACE OF BIRTH ....

7 GIVE DATES OF RESIDENCE OUTSIDE MINN. ....

DISEASE CENSUS CARD

(Front)

Age

To be filled out by student's MOTHER if possible, otherwise by person who cared for student during childhood.

Date of Record

191

School and Grade

I know that this student had

Chicken pox when .... years old

Diphtheria when .... years old

German Measles when .... years old

Infantile Paralysis when .... years old

Measles when .... years old

Mumps when .... years old

Pneumonia when .... years old

Rheumatism when .... years old

Scarlet Fever when .... years old

Smallpox when .... years old

Tonsilitis when .... years old

Tuberculosis when .... years old

Typhoid Fever .... years old

Whooping Cough when .... years old

and .... when .... years old
name of disease

....

Sex

Student was vaccinated when .... years old

Signed ....
Mother of Student.

Form XI

DISEASE CENSUS OF SCHOOL CHILDREN SUMMARY

Use "A" for Chickenpox
"B" " Diphtheria
"C" " German Measles
"D" " Measles
"E" " Mumps
"F" " Pneumonia
"G" " Scarlet Fever
"H" " Smallpox
"I" " Tuberculosis
"J" " Typhoid Fever
"K" " Whooping Cough
"V" " Vaccination

______________________________ Minn.
City, Village, Township

______________________________ Co.

Reported by______________________________
Name of School

Tabulated by______________________________

______________________________19__

Under letter of disease mark year of age during which the child had this disease. Under "Total Sick" and "Total Well" make a "1" for each child

Total Well		Total Sick			INDEX OF DISEASES																									
					"A"		"B"		"C"		"D"		"E"		"F"		"G"			"H"		"I"		"J"		"K"		"V"		
M	F	M	F		M	F	M	F	M	F	M	F	M	F	M	F	M	F		M	F	M	F	M	F	M	F	M	F	
				1															1											1
				1															1											1
				2															2											2
				1															1											1
				2															2											2
				3															3											3
				1															1											1
				2															2											2
				3															3											3
				4															4											4
				1															1											1
				2															2											2
				3															3											3
				4															4											4
				5															5											5

FORM XI—Continued

M	F	M	F		"A"	"B"	"C"	"D"	"E"	"F"	"G"		"H"	"I"	"J"	"K"	"V"	
				1								1						1
				2								2						2
				3								3						3
				4								4						4
				5								5						5
				6								6						6
				1								1						1
				2								2						2
				3								3						3
				4								4						4
				5								5						5
				6								6						6
				7								7						7
				1								1						1
				2								2						2
				3								3						3
				4								4						4
				5								5						5
				6								6						6
				7								7						7
				8								8						8

Form XII.

Dover township. Olmsted County.

Dist. No.	Pupils' Age			Total	
	5-8	8-18	18-21		
12	6	16	......	22	July, 1912. J. W. Busian, C. B. S. P. O. Dover.
13	4	7	......	11	
19	1	5	......	6	
48	5	5	.....	10	
50	2	12	......	14	
75	2	26	.....	28	
123	3	9	......	12	
125	5	66	3	74	

Sample Card, School Population Index.

BIENNIAL REPORT
OF THE
Laboratory Division

When in 1910 the increasing amount of work necessitated the complete reorganization of the technical workers of the State Board of Health, the Laboratory Division as a separate and distinct division was created, together with the Epidemiological Division and the Engineering Division. At that time the Laboratory Division was divided into several subdivisions, as follows:

A. Main Laboratories.
  1. Diagnostic Laboratory.
  2. Chemical Laboratory.
  3. Pasteur Institute.
B. Branch Laboratories.

This organization has been continued during this biennial period.

The work of the Diagnostic Laboratory consists of the routine examination of nose and throat cultures for diphtheria bacilli; the examination of specimens of sputum suspected of containing tubercle bacilli; the examination of specimens of blood for the Widal reaction; examination of spinal fluid to determine the presence of the causative organism in cerebral inflammations; and the preparation and distribution of typhoid prophylactic.

The work in the Chemical Laboratory consists of the field and laboratory examination of water supplies; the analytical work in connection with sewage systems; the examination of embalming fluids; and the examination of milk where it is sought to produce either certified or inspected milk; and the field and analytical examination of ice.

In the Pasteur Institute human beings are given the prophylactic treatment for rabies, and examinations are made as required of animals which are suspected of rabies.

Two branch laboratories exist, one at Duluth, created in 1907, and one in Mankato, created in February, 1912. The idea of these laboratories is to relieve the main laboratory of a certain amount of the routine diagnostic work and to save time in obtaining and transmitting reports to physicians in their immediate vicinity. These will be discussed later under their respective heads.

PERSONNEL.

The present laboratory staff consists of the following individuals:

R. H. Mullin, B. A., M. B., director.

MAIN LABORATORIES.

O. McDaniel, M. D., chief Pasteur Institute.
H. A. Whitaker, B. A., chief Chemical Laboratory.

B. M. Mohler, B. A., assistant chemist.
W. G. Thorne, M. D., bacteriologist.
G. A., Geist, B. S., M. D., assistant bacteriologist.
Agnes Bacon, head clerk.
Ruth McCall, stenographer.
Florence Burns, record clerk.
John C. Clarke, head attendant.
Alex Janzig, attendant.
Frank Raab, attendant.
Edward Nelson, attendant.
Walter Anderson, attendant.
A. G. Anderson, attendant.

DULUTH BRANCH.

T. R. Martin, B. A., M. D., bacteriologist in charge.
Anna Segerman, clerk.

MANKATO BRANCH.

C. C. Pratt, B. A., M. D., bacteriologist in charge.

A perusal of the personnel shows that during the biennial period there has been a considerable change. It is to be expected that frequent changes will be found from year to year as the Epidemiological Division looks to the laboratory staff for workers in its particular field. By common consent it is found that workers in the Epidemiological Division should have had a thorough training in laboratory procedures and routine before taking their place in the field, so that one of the functions of the Laboratory Division is to supply workers to the Epidemiological Division from time to time as necessity arises. These changes, however, should affect only the younger members of the technical staff. On the other hand, during this biennial period, changes have occurred affecting every one from the head of the division down. In fact, only three individuals who were members of the staff during the preceding biennial period are at present connected with the Laboratory Division.

By continuing the principles that have been in effect since the laboratory was started, there has been little diminution either in the efficiency or quantity of the work which has been done.

Nevertheless the laboratory has suffered severely in losses to its staff which have been sustained. First, the greatest loss was in the resignation of Dr. F. F. Wesbrook, who has been director of the laboratory since it was founded, his resignation having been accepted by the board in January, 1911. The extent of the loss which has thus been suffered can be appreciated best only by those who have been in intimate contact with him. This loss is partially compensated by his appointment as a member of the Board and by the active interest he has still retained in the Laboratory Division since his actual connection has been dissolved. Too much cannot be said regarding his previous administration, for it was under him that the laboratory of the State Board of Health attained its present high efficiency and, by following out the methods and principles which he devised, it is hoped that the future efficiency of the laboratory will be undiminished.

Not only did the laboratory lose so valuable a head, but in addition, Dr. A. J. Chesley, who, under Dr. Wesbrook, was chief of the Diagnostic Laboratory, was transferred to the Epidemiological Division. This made another severe loss to the laboratory. It is almost impossible to put a sufficiently high estimate on the large amount of work that Dr. Chesley did for the laboratory during his connection with it. The modifications of methods which he introduced into the service have been of inestimable value. Although no longer a member of the laboratory staff, since his connection with the Epidemiological Division, he has maintained a large amount of interest in the laboratory procedures and has always been only too willing to lend his assistance, energy and advice in solving difficulties which arose from time to time in the laboratory.

During the biennial period the Laboratory Division further suffered by the resignation of Dr. E. L. Tuohy, who had been bacteriologist in charge of the Duluth branch since its beginning. The situation at Duluth required a man not only well trained in scientific work, but also one who could readily adapt himself to new circumstances and whose personality would be pleasing under the most trying circumstances. The constant increasing growth of the Duluth branch is a sufficient indication of how well Dr. Tuohy has performed his difficult task. That the branch laboratory in Duluth should have been as successful as it has been is due almost entirely to the unceasing efforts of Dr. Tuohy, to whom too much praise cannot be given.

Owing to these several depletions from the ranks of laboratory workers, your present director was confronted with a difficult task. That any success at all has been attained is due entirely to the support, co-operaion and self-sacrfice which has been engendered into the laboratory staff by the previous director.

There has been a considerable change also among the younger members of the staff. Dr. S. W. McEwan, after remaining with the division for a year, has gone into the federal service. Drs. R. T. Healy and Justus Ohage, Jr., rendered valuable temporary assistance in time of need.

NATURE OF THE REPORT.

The report is divided into sections, each sub-division of the laboratory having prepared the material for the report from that sub-division. At the end of the report Table XIV. shows the amount of work done in the main laboratories for each locality, and Table XV. shows the total amount of work done by the Laboratory Division for each county.

DIAGNOSTIC LABORATORY.

The Diagnostic Laboratory is supervised by the director. The work consists of the routine examination of

1. Cultures from patients suspected of diphtheria.
2. Sputum from patients suspected of tuberculosis.
3. Blood for the Widal reaction.
4. Spinal fluids.
5. Preparation of vaccines.
6. Miscellaneous specimens.

The methods which have grown up in the Diagnostic Laboratory during the previous administration have been continued with practically no change and have been found entirely satisfactory for working purposes. There has been no collected account of the various methods used in this laboratory either for collecting specimens or for making reports upon examinations which have been made. It has been thought advisable therefore to describe all of the methods at present in use although they have been devised during the previous administration.

Diphtheria. Routine examinations of cultures from individuals suspected of having diphtheria may be used for the following purposes: (1) making or confirming a diagnosis; (2) releasing a patient from quarantine; and (3) discovery of a diphtheria carrier. Experience in Minnesota and other places has already demonstrated the superiority of the cultural method over all other methods, in the control of diphtheria. In state work one difficulty exists which may possibly detract slightly from the best results, namely, the time lost in transit. Our experience has been that express companies, as a rule, are not fully alive to the necessity of preventing any possible loss of time. With this idea in mind, a mailing outfit has been prepared which meets the requirements of the postal authorities and by means of which it is possible to save a considerable portion of the time lost when express was used. Further, mail is delivered at regular intervals, differing in this respect from the more or less irregular delivery of express, and the laboratory procedure can be adjusted to such intervals.

The outfit which has been devised consists of double mailing cans, one inside the other, both being fitted with screw caps, the outside can having an inside felted lining around it and at the top and bottom. The inside can contains two serum tubes, one for the nose and the other for the throat culture, and two sterilized swabs made from wooden applicators in a third tube. These tubes are wrapped adequately in cotton to prevent so far as possible damage in shipment. The serum tubes are labeled to show that each is to be used for nose or throat, the label of the throat culture being printed in red and the label for the nose culture being printed in black. Evaporation of the serum is prevented by the use of a rubber cap. Around the outside can there is placed directions for collecting and forwarding specimens for diphtheria examination, which read as follows:

DIPHTHERIA OUTFITS.

LABORATORY DIVISION, MINNESOTA STATE BOARD OF HEALTH.

Directions for Collecting and Forwarding Specimens for Diphtheria Examination.

FOR THROAT SPECIMENS.

1. Thoroughly rub one swab against any visible exudate, if present, otherwise against all injected mucous membrane of the fauces and pharynx.
2. **Do not lay the swab down** or allow it to touch anything else than the surface of the serum over which it should be rubbed firmly without breaking through.
3. Replace the cotton plug in the serum tube, break off the protruding end of the swab and fit the rubber cap over the mouth of the serum tube, **leaving the swab inside on the serum.**

FOR NOSE SPECIMENS.

These may be easily procured from children by the following method:

1. Physician should stand behind the sitting* patient and, with his left hand on the patient's chin, hold the head firmly against his body. With the right hand insert the swab about one-half inch upward into the right naris, then raise the hand so the shaft of the swab is parallel to the floor of the naris and, with gentle rotation, pass the swab back to the posterior pharyngeal wall. Withdraw the swab and repeat in other naris. Always note on the data blank any reason of failure (enlarged turbinates, etc), if the operation was unsatisfactory.
2. **Do not lay the swab down** or allow it to touch anything else than the surface of the serum over which it should be rubbed firmly without breaking through.
3. **Do not leave nose swab in the serum tube,** but carefully replace it in the swab tube, plug both tubes and fit the rubber cap over the mouth of the serum tube.

Wrap the tubes as they were, place them in the small can upside down, place this can, together with the data blank in the mailing case upside down and mail or express immediately to the laboratories.

Do not use dry or contaminated serum. Send such outfits to the laboratories and request fresh ones in exchange.

*This position is preferable when the patient's condition allows it.

R. H. MULLIN,
Director.

Around the inside can there is also placed a diphtheria data blank which reads as follows:

DIPHTHERIA DATA.

LABORATORY DIVISION, MINNESOTA STATE BOARD OF HEALTH.

University Campus, Minneapolis.

Please fill out this blank IN FULL and place around the small can.
Date and hour of taking culture................Is this the first culture?...........
Patient's name......................................Age...........Sex...........
*Township
Village } Residence..............................County......................
City
Postoffice address ....
Physician's name........................Address..................................
Health officer's name...................Address..................................
Clinical diagnosis.................Is membrane present?.........Temp...........
Date of first symptoms........This examination is *For bacterial diagnosis.
For release from quarantine.
Do you desire a telegraphic report?..
(On request, telegraphic reports are sent, collect, to the attending physician.)
*Strike out words that do not apply. Remarks (Over)

This data blank is filled in by the physician and returned with the culture outfit. The outside can bears a wrapper gummed along one edge only so that after it has been used once it can be easily removed from the can and a fresh one substituted. It bears the following address and shows that after a certain date the medium should be returned for fresh outfits.

LABORATORY DIVISION.

MINNESOTA STATE BOARD OF HEALTH.

c o. University of Minnesota, Minneapolis.

(Mailing case approved by U. S. Post Office Department.)
"Specimen for Bacteriological Examination.
THIS PACKAGE to be pouched with LETTER MAIL.
See Section 495, P. L. and R."
After......................................exchange for fresh outfit.

Such outfits are pouched with letter mail and experience has shown that they arrive in the laboratory in good condition. In this way a considerable amount of delay is saved both for the laboratory and the physician. Where necessity for extra haste is needed, special delivery stamps may be used, thereby saving more time. Experience has shown that this method is a decided improvement over the older method by express.

On their arrival at the laboratory the specimens are numbered serially and placed in the incubator so as to be given eighteen hours incubation.

In reporting upon diphtheria examinations, blanks measuring $3\frac{1}{2}$x6 inches are used. A sample is shown below:

DIPHTHERIA REPORT.

LABORATORY DIVISION, MINNESOTA STATE BOARD OF HEALTH
University Campus, Minneapolis.

........................Received..
Patient..Sanitary district................
Physician.......................................Address.......................
H. O...Address.....................
Nose culture..
Throat culture...
Remarks ....
....
Diagnosis..
Reported...(OVER)

R. H. MULLIN, Director,—Per
Bacteriologist.

The blanks are filled out in the laboratory from the information supplied by the physician on the data blank, the findings written in the proper place, listing the types of diphtheria bacilli found, and a diagnosis made. An interpretation of the findings is printed on the reverse side of the slip, reading as follows:

Note carefully:

The diagnosis given vary in wording and interpretation as follows:

I. **"Diphtheria"** means that **B. Diphtheria** was demonstrated culturally and microscopically, with or without marked admixture with other microbes. When others are numerous their presence is noted. The relative number of the bacilli of diphtheria found, or their short or long persistence cannot be taken as an index of the danger of contagion.

Certain letters in parenthesis following the words **B. diphtheria**, indicate the morphological varieties of the bacilli present and are for laboratory reference only.

II. **"No diphtheria bacilli found,"** means simply that **B. diphtheria** was not found in the specimen examined, which may have been due to:

(a) Improper technique in applying the swab. Considerable vigor should be used so that not only the prominent parts of the mucous membrane, but the depressions have been rubbed. The depressions are less apt to have been mechanically cleaned by swallowing foods, gargling, etc.

(b) Some antiseptic may have been used immediately prior to taking the specimen, thus interfering with subsequent development of the culture.

(c) Improper technique in smearing the swab over the surface of the medium, whereby the infected surface of the swab was not brought in contact with the solidified serum.

(d) It is, of course, possible that a very few diphtheria bacilli, amongst a large number of other bacteria, in the growth might be overlooked in the laboratory. This after careful statistical study of many examinations, has been found to be unlikely to occur.

(e) Entire absence of **B. diphtheria.**

III. No diagnosis may be given, on account of non-development or scanty growth of culture. This frequently happens when specimens are received on swabs or dried media. Then **"No growth," Scant growth,"** or **"Specimen unsatisfactory,"** is reported and another specimen is asked for. A NEGATIVE DIAGNOSIS IS NEVER MADE ON A SPECIMEN SENT IN ANY OTHER WAY THAN ON FRESH CULTURE MEDIUM. (Loffler's blood serum.)

Under III, sometimes a reserved diagnosis is made. We have experienced some difficulty in explaining to attending physicians the exact meaning of a reserved diagnosis. It may be given for several reasons.

First, when a single culture from either nose or throat is sent in. Our experience has shown that it is a matter of frequent occurrence to find diphtheria bacilli in the nose without their being in the throat. Sometimes the organisms will appear in the throat while the nose remains clear. As a precautionary method the regulations of the board require both nose and throat cultures. Occasionally there is a very slight, if any, growth upon either one of the culture tubes, in which event a reserved diagnosis is made and subsequent cultures requested. We have found it, too, that frequently spore-bearing bacilli will appear on the culture tube apparently completely obscuring any other micro-organism. Here, too, a reserved diagnosis is made. The factors which may enter into the occurrence of these several events is a matter which is under investigation at the present time.

In this way the exact meaning of the laboratory findings may be determined by the physician. These reports are made in triplicate by the use of carbon paper, the original being written with indelible pencil. This original report is placed in a manila envelope, open at one end, bearing on its face the following printing and is filed in the laboratory:

Patient.................................Dr..................of..................

Age..........Sex............P. O.............................S. Dist.......................
Township, Village, City

Clin. Diag...Co..................

M. D.
H. O...C. B. S. P. O..........................

Examination No	Day of Disease	Date of Cultures	Date of Report	Diagnosis	Remarks
93453-4	2	7.1.12	7.3.12	Diphtheria	(CDC'D) C'D'CD)
93618-9	9	7.8.12	7.10.12	Diphtheria	(CDC'D') (no growth)
93765-6	18	7.17.12	7.19.12	Diphtheria	(CD) (Sta.)
93801-2	22	7.21.12	7.23.12	No dipht'eria bacilli found	
93864-5	28	7.27.12	7.29.12	No dipht'eria bacilli found	

By the use of such an envelope it is possible to keep a complete bacterial history of the individual available on a moment's notice. The envelopes are 3¾x6 inches, so that they will fit an ordinary 4x6 filing device. They are filed alphabetically by locality under the physician's name. In this way it is possible to immediately determine the exact number of cases of diphtheria in any locality at a given time, from which cultures are being examined.

The attending physician and the health officer of the district each receive a carbon copy of the report.

In addition, in the laboratory, for the use of the executive officer, the Epidemiological Division and the Laboratory Division there is kept a daily record sheet, upon which are recorded each day all the specimens of diphtheria which come in on that particular day. This daily record sheet is of the standard letter size, perforated at one end so that it will fit a Globe-Wernicke "Columbia" file. A sample daily record is found below, having been selected at random:

LABORATORY DIVISION, MINNESOTA STATE BOARD OF HEALTH

1912, 8207 Total

DIPHTHERIA RECORD FOR JULY 31 THIRD QUARTER 1912, 457 Total

Specimens			Patient	Sanitary District	Physician	Address	Bacterial Diagnosis			Case	
D	R	No.					+	−	R	Lab.	Phy.
1	......	93881–2	Lawrence Hart......	Mazeppa..........	W. B. Heagerty.....	Mazeppa..........	+	......	......	+	+
......	10	93883–4	Marjorie Tallman....	Willmar...........	E. H. Frost.........	Willmar...........	+	......	......	......	......
......	3	93885–6	Dr. W. M. Newhall..	Crystal Bay........	J. P. Wilkins........	Mound............	......	......	R	......	......
1	......	93887–8	Mr. Emil Grams.....	Le Roy twp.........	W. A. Meilicke......	Janesville..........	......	......	R	R	+
1	......	93889–90	Emil Grams........	Le Roy twp.........	W. A. Meilicke......	Janesville..........	+	......	......	+	+
1	......	93891–2	Alma Grams........	Le Roy twp.........	W. A. Meilicke......	Janesville..........	+	......	......	+	+
1	......	93893–4	Walter Grams.......	Le Roy twp.........	W. A. Meilicke......	Janesville..........	+	......	......	+	+
......	10	93895–6	Carrie Kasch........	St. Peter..........	H. A. Tomlinson...	St. Peter..........	+	......	......	......	......
......	24	93897–8	Dorothy Sieburg.....	St. Peter..........	H. A. Tomlinson....	St. Peter..........	+	......	......	......	......
......	21	93899–900	Mary Lepel.........	St. Peter..........	H. A. Tomlinson....	St. Peter..........	+	......	......	......	......
......	22	93901–2	Margaret Sheehan...	St. Peter..........	H. A. Tomlinson....	St. Peter..........	+	......	......	......	......
......	21	93903–4	Ellen Pearson.......	St. Peter..........	H. A. Tomlinson....	St. Peter..........	+	......	......	......	......
2	......	93905	Alvina Brueske......	Ida twp............	C. A. Lester........	Alexandria.........	+	......	......	......	......
......	7	93906–7	Mrs. Chas. Raeper...	Red Wing..........	A. E. Johnson.......	Red Wing..........	+	......	......	......	......
......	4	93908–9	Geraldine Schleinski..	Red Wing..........	A. E. Johnson.......	Red Wing..........	+	......	......	......	......

Specimens			Classification	Cases			
Diag.	Rel.	Total		+	−	R	Total
102	326	428	.......Brought forward........	23	28	14	65
			....Former diagnoses refuted...				
11	18	29	.........Today's results.......	4	....	1	5
113	344	457	........Quarter's results.......	27	28	15	70

This daily record sheet requires some explanation. One or more, if required, are filled out for each particular day and collected together under the four quarters of the year for the purposes of the quarterly reports made to the Board.

On the right-hand side above is shown the total for the year and the total for the quarter. The column at the left "Specimens" serves several purposes. Under number is placed the laboratory serial number of the examination. The columns "D" and "R" are used to indicate whether the specimen was sent in for bacterial diagnosis or for release from quarantine, in each case the number of the culture from that particular case being indicated by the required numeral.

On the right side, under the columns grouped under "B. Diag." are placed the results of the bacteriological examination; the plus sign indicating that diphtheria bacilli have been found, the minus sign indicating that no diphtheria bacilli have been found, and "R" indicating that the diagnosis has been reserved for some particular reason.

In the columns headed "Case" are recorded the laboratory diagnosis and the physician's diagnosis in the columns so indicated. Under the physician's diagnosis a plus sign is used when the physician gives a clinical diagnosis of diphtheria, membranous croup or membranous angina, a minus sign is used when the physician did not think the case to be clinically diphtheria, a question mark is used when the physician was suspicious of clinical diphtheria, an "E" is used when the patient has merely been exposed to diphtheria and an "O" is used when the physician neglected to make any statement about the clinical diagnosis.

By daily reference to the first specimens recorded as "1" under "D" and "R" and to the case diagnosis, all positive and suspicious cases can easily be kept track of and when a case runs over the time limit of release from quarantine without having had two negative reports from the laboratory, the Epidemiological Division look in their file for the time limit release report from the health officer. If it is not on file, the matter of reporting quarantine release may be reported to the executive officer for action.

At the bottom of the daily record sheet is a summarized classification of the results, showing the number of examinations for that particular day and the total for that particular quarter up to that day. In this way it is possible at a moment's notice, to obtain an idea of the amount of work which has been done in any one quarter.

The records are made while the case is still in the mind of the observer and it is not necessary to go back over old records, thus running the risk of forgetting some of the events.

The work of the Diagnosis Laboratory in diphtheria may be divided into two parts; the ordinary routine examination of cultures, which have been sent in, and special examinations, made where an epidemic of diphtheria is in progress or is feared.

The statistics regarding the routine examination of cultures are classified in tables I., II. and III. Tables I. and II. show the amount of work done by months. Table III. shows the amount done by years. Some explanation of these tables is required.

It will be found that the total number of cases sent in for diagnosis is always less than the total number of laboratory examinations made on specimens for diagnosis. This is accounted for by the fact that frequently where a negative or reserved diagnosis is made in the laboratory, the physician attending the case where symptoms continue to resemble those of diphtheria, will send in second cultures so that in some cases more than one laboratory examination is made before a diagnosis of diphtheria can be confirmed.

TABLE I—SHOWING ROUTINE DIPHTHERIA EXAMINATIONS FROM JULY 31, 1910, TO AUG. 1, 1911

From July, 1910 To August, 1911	Specimens Sent for Diagnosis								Specimens Sent for Release from Quarantine					Total	Total	Total	Total	Total
	Cases	Physician's Diagnosis			Laboratory Diagnosis													
		+	−	Dbtfl.	+	−	R	Total	Cases	+	−	R	Total	Cases	+	−	R	Exam.
August	172	67	33	72	82	78	12	172	169	127	200	11	338	341	209	278	23	510
September	95	36	16	46	47	40	11	98	114	112	162	7	281	209	159	202	18	379
October	144	57	36	55	63	74	11	148	120	126	140	11	277	264	189	214	22	425
November	163	55	42	66	50	107	6	163	108	117	172	15	304	271	167	279	21	467
December	228	77	48	103	75	139	14	228	115	110	171	17	298	343	185	310	31	526
January	160	63	53	53	50	87	32	169	77	73	110	43	226	237	123	197	75	395
February	183	48	73	62	43	107	33	183	54	102	70	35	207	237	145	177	68	390
March	196	70	60	73	56	110	37	203	77	91	78	22	191	273	147	188	59	394
April	152	40	48	64	57	80	15	152	97	71	109	28	208	249	128	189	43	360
May	170	61	47	64	45	113	14	172	73	88	101	10	199	243	133	214	24	371
June	84	33	24	27	25	52	7	84	67	57	91	24	172	151	82	143	31	256
July	72	23	19	30	11	44	17	72	66	8	71	12	91	138	42	134	29	205
Total	1,819	630	499	715	604	1,031	209	1,844	1,137	1,082	1,475	235	2,792	2,956	1,709	2,525	444	4,678

TABLE 11 — SHOWING ROUTINE DIPHTHERIA EXAMINATIONS FROM JULY 31, 1911, TO AUG. 1, 1912

From August, 1911 To July, 1912	Specimens Sent for Diagnosis								Specimens Sent for Release from Quarantine					Total	Total	Total	Total	Total
	Cases	Physician's Diagnosis			Laboratory Diagnosis													
		+	−	Dbtfl	+	−	R	Total	Cases	+	−	R	Total	Cases	+	−	R	Exam
August	55	22	10	23	22	26	7	55	45	31	41	9	81	100	53	67	16	136
September	93	42	22	31	41	39	15	95	44	49	61	4	114	137	90	100	19	209
October	123	34	25	65	42	66	16	124	65	85	62	17	164	188	127	128	33	288
November	114	38	27	50	35	67	13	115	34	49	43	16	108	148	84	110	29	223
December	151	45	47	59	36	82	33	151	73	51	62	37	150	221	87	114	70	301
January	140	44	46	59	43	81	25	149	75	102	85	15	202	215	145	166	40	351
February	150	52	55	47	44	86	24	154	66	56	91	13	163	216	100	180	37	317
March	105	23	48	38	19	65	25	109	56	82	92	7	181	161	101	157	32	290
April	121	50	43	35	40	61	27	128	57	35	56	19	110	178	75	117	46	238
May	81	32	26	32	24	45	21	90	40	51	43	18	112	121	75	88	39	202
June	92	35	23	36	26	44	21	94	38	31	64	11	106	130	57	108	35	200
July	71	22	28	21	26	26	19	71	15	31	22	2	55	86	57	48	21	126
Total	1,299	439	420	496	398	688	249	1,335	608	653	725	168	1,546	1,907	1,051	1,413	417	2,881

TABLE III—SHOWING ROUTINE DIPHTHERIA EXAMINATIONS BY YEARS FOR BIENNIAL PERIOD

YEAR From August 1st To July 31st	Specimens Sent for Diagnosis								Specimens Sent for Release from Quarantine					Total Cases	Total Positives	Total Negatives	Total Reserves	Total Examinations
	Total Cases	Physician's Diagnosis			Laboratory Diagnosis													
		+	–	Dbtfl.	+	–	R	Total	Cases	+	–	R	Total					
1910–1911	1,819	630 34.7%	499 27.4%	715 39.3%	604 32.8%	1,031 55.5%	209 11.3%	1,844	1,137	1,082	1,475	235	2,792	2,956	1,709	2,525	444	4,678
1911–1912	1,299	439 33.7%	420 32.3%	496 38%	398 29.1%	688 51.5%	249 18.7%	1,335	608	653	725	168	1,546	1,907	1,051	1,413	417	2,881
Total	3,118	1,069 34.3%	919 29.4%	1,211 38.8%	1,002 31.5%	1,719 54%	458 14.4%	3,179	1,745	1,735	2,200	403	4,338	4,863	2,760	3,938	861	7,559

In table III, which is a summary of tables I and II, some very interesting features are observable. It is to be noted that in only 34.3 per cent of the number of cases sent in for diagnosis has a positive diagnosis been made by the physician, while the laboratory positive diagnosis run only 31.5 per cent. This indicates that not necessarily all cases of clinical diphtheria will show diphtheria bacilli upon laboratory examination. Undoubtedly a certain number of cases diagnosed clinical diphtheria are not diphtheria at all, whilst it is also probably true that in a certain proportion of true diphtheria it is not possible on a limited number of examinations to find diphtheria bacilli. This is especially true in those cases of infants where difficulties of obtaining cultures are very apt to occur. In state work probably another factor enters to a certain extent, although it is a small one, i. e., a certain number of cases of true diphtheria may fail to show the organism in laboratory examinations on account of its having been lost in transit; that is, diphtheria bacilli present originally may have died out before the cultures arrived at the laboratory. In all cases where a reserved diagnosis is made, a request is made on the report, asking for other cultures. This request is not always complied with, in fact, the table shows that in the majority of cases subsequent cultures are not sent, for while the total number of reserved diagnoses in the laboratory is 458, the total number of repeated examinations, shown by subtracting the total number of cases from the total number of laboratory diagnosis, is only 61. Probably many of these cases cleared up sufficiently to enable the attending physician to make a diagnosis himself. The figures given in these tables should not be taken as representing accurately the amount of diphtheria present through the state. Undoubtedly they are much too low to represent the actual condition of affairs in Minnesota so far as diphtheria is concerned. They do, however, draw attention to the fact that the cultural method for release from quarantine does not receive the amount of use which should be made of it by attending physicians. Nor do the tables represent the exact amount of work the laboratory has done in the routine examination of diphtheria. The total number of examinations shown by the table is placed at 7,559. It should be understood that this does not represent both nose and throat cultures so that these figures should be almost doubled in order to determine an approximate idea of routine work accomplished during the biennial period. It will be interesting to compare this table with a similar one to be made out for the next biennial period in order to check the follow-up system which has just been devised and which will be put into operation in the course of the next biennial period. It is to be further observed from the statistics available that physicians do not send in specimens for diagnosis for all cases. During the biennial period there were a total number of 1,002 cases in which a diagnosis of diphtheria was made by laboratory examination. On the other hand, 1,745 cases were sent in for release from quarantine. This may be accounted for by the fact that frequently the distance is so great that a diagnosis of diphtheria is made without laboratory examination, whereas the cultural method is used for release from quarantine. As has already been shown, the failure to use the laboratory diagnosis may result in an injustice to individuals who were kept in quarantine where there may have been no diphtheria bacilli present. It is impossible to make any deductions regarding the number of examinations made for release from quarantine inasmuch as it is a frequent occurrence to find that a physician will not send in more than one culture for release from quarantine. On the other hand, during epidemics the cases are under direct supervision, therefore such deductions will be discussed under the epidemics.

That the cultural method is not being used as generally as it should be, is shown by the following table derived from the quarterly reports made to the Board.

TABLE IV

Quarter Ending	No. of Cases Positive	Released on 2 Negatives		Released on 1 Negative		Released Without Negatives	
Dec. 31-10	311	145	47%	67	21%	99	32%
Mar. 31-11	198	95	48%	30	15%	73	37%
June 30-11	233	108	46.5%	63	27%	62	26.5%
Sept. 30-11	142	72	50%	34	25%	36	25%
Dec. 31-11	357	195	55%	70	20%	92	25%
Mar. 31-12	186	58	31%	45	24%	83	45%
June 30-12	387	304	79%	36	9%	47	12%
Sept. 30-12	*	*	*	*	*	*	*
Total for 21 months	1,814	977	54%	345	19%	492	27%

*In this table the figures for the last quarter of the biennial period are not included inasmuch as the returns are not yet completed.

These returns show that of the 1,814 cases of diphtheria which were known to exist by laboratory examination only 54 per cent were released after having had two consecutive negatives according to the regulations of the Board; 19 per cent, so far as we know, were released after having obtained only one negative; and in 27 per cent no negatives were obtained. Whether or not the individuals concerned in the last two groups were released on a time limit cannot be determined from the information available. It will be interesting to compare these results with those which we will obtain after the follow-up system, which is to be instituted during the next biennial period, is adopted.

Apparently some of the physicians are beginning to appreciate the value of the cultural method for release from quarantine for we find that during the last quarter for which statistics are available, the increase in the number of individuals who were released on two negatives is very great, practically four-fifths of the individuals infected being released in this way. Whether or not this is by accident cannot be determined but it is possible that the season of the year had some bearing upon the matter. This would be the time of year when many people would like to get away for their summer vacation and would prefer a rapid method for release from quarantine rather than waiting for the legal six weeks period.

An analysis of the total number of examinations that have been made for diphtheria may be shown in the following table V, derived from quarterly reports made to the Board. The number of examinations for each quarter is shown.

TABLE V

Quarter Ending	Number of Examinations	Number of Cases	Number of Positive Cases	Number of Physicians	Number of Localities
Dec 31-10.	4,700	2,547	359	274	201
Mar. 31-11	2,459	780	198	169	268
June 30 11.	2,639	816	233	247	232
Sept. 30 11	1,686	453	142	173	232
Dec. 31-11.	5,981	2,684	357	227	225
Mar. 31-12	3,183	973	186	228	211
June 30-12	5,567	1,687	387	186	186
Sept. 30-12	2,011	416	145	137	139

While these statistics are not exact in the sense that they are an accurate record of the exact number of cases of diphtheria occurring in the state, they do indicate in round figures the relative seasonal incidence of the disease.

It appears from this table that from September until June, a period when the various schools throughout the state are in session that the number of cases of diphtheria is greatest and that during the same period the number of specimens sent in for examination is also greatest. During the summer months, when there is a vacation period in the schools there is a marked falling off not only in the actual number of cases of diphtheria but also in the number of cultures sent for examination. In the table, the large number obtained during the quarter ending June 30, would seem to be an exception to the generality so stated. This is accounted for by the fact that during this quarter a large epidemic involving some 4,000 examinations, by means of which 271 positive cases were found by laboratory examinations, occurred at the State Hospital for the Insane at St. Peter. If the number of examinations for the St. Peter epidemic be subtracted from the total number for the quarter, we find that only some 1,500 specimens were sent for examination and that there were only 116 positive cases found. These figures bear out the theory generally accepted by those who have had much work in diphtheria that the diphtheria incidence is a matter of opportunity for conveying infection from one individual to another and not a question depending upon climatic conditions or the relative response of sensitive organs at different periods in the year. In our experience the incidence of diphtheria depends upon the density of population. Other factors may take a small part but undoubtedly this is the main factor concerned in the spread of the disease.

DIPHTHERIA EPIDEMICS.

During the biennial period eighteen epidemics of diphtheria occurring in situations where there were large collections of people exposed to infection have been investigated by the cultural method. These are listed in table VI below.

In handling diphtheria epidemics by the cultural method slight variations from the procedure which obtains in the routine work occur. These variations are adaptations from the routine method for the purpose of taking care of the large number of individuals which may have been exposed. The "filter" method is one that has been adopted for a long time in this state and has already been adequately described in previous communications from this laboratory.

Where a large number of people may have been exposed to a diphtheria infection it is necessary to take a large number of cultures in order to determine the infected individuals. The presence or absence of diphtheria bacilli in the nose or throat of an individual exposed to diphtheria infection cannot be determined by physical examination nor by clinical symptoms. The only safe method for determining whether or not diphtheria bacilli are present in an individual exposed to infection is the cultural method, and it provides at the same time the best, quickest and safest means for controlling an epidemic or aborting a threatened epidemic. An abundance of evidence in the support of this statement can be found in the careful perusal of statistics which are available in our records.

Where a considerable population has been exposed to diphtheria, in order to determine the infected individuals, it is necessary to take cultures from both nose and throat of every individual who has in any way been exposed to the infection. Such a procedure will naturally throw a tremendous amount of work suddenly upon the laboratory so that means have to be taken to lighten the work as much as possible in order that the results may be obtained as rapidly as it is consistent with accuracy. For this reason, during an epidemic or where an epidemic is expected, the preliminary nose and throat cultures taken for the determination of infected individuals are sown on one culture tube rather than on separate culture tubes. In this way the number of laboratory examinations is cut in half and we find by experience that there is no diminution in the efficiency.

This is explained by the fact that where an epidemic is in progress or expected, individuals are put under restraint in a "filter" room when diphtheria bacilli or suspicious organisms are found. In dealing with such epidemics we find that our number of reserved diagnoses is considerably larger than the number which obtains in the ordinary routine work, owing to the fact that we will more freely make use of the reserved diagnosis, knowing that the case is under control and knowing that individuals will be released from restraint should subsequent cultures prove negative.

The exact method of handling an epidemic in the field is described in the report of the Epidemiological Division. Usually if such an epidemic occurs in a locality where they have had no previous experience a trained investigator from the Epidemiological Division will visit the locality and give instructions concerning the proper method of taking cultures from a large number of individuals. A little practice renders this process a comparatively easy one which can be accomplished in much less time than might be expected. In order to further relieve the laboratory worker some of the clerical work is done by the investigator at the time. In addition to culture outfits which are sent out "in bulk" from the laboratory, the investigator takes with him special diphtheria cards which have the following form:

PATIENT **DR.** **ADDRESS**
AGE **SEX** **RESIDENCE**

Date of Culture	Date of Diagnosis	Nose No.	Findings	Throat No.	Findings

These can be easily adapted to almost any condition of affairs that is ordinarily met. In the ordinary routine that occurs in school epidemics, for instance, the investigator will take the cultures from nose and throat of the child, will then hand the inoculated culture tube with one of the cards to the child who takes both card and culture tube to the teacher. The teacher is of course familiar with the child's name and writes the name of the child and the particular class or room in which the child is on the card and at the same time writes a serial number on the card and on the culture tube. In this way an easy means of identification of both culture tubes and cards is obtained. Both are given a laboratory serial number when they arrive in the laboratory.

We find that by this method little, if any, confusion is evidenced and that there is practically no mixing of cultures or cards. These cards are filled out by the teacher only at the time the first cultures are taken. They remain on file in the laboratory and are used for the history of each case during the course of the epidemic. All nose and throat cultures subsequent to the first are taken on separate nose and throat culture tubes.

TABLE VI
SHOWING SPECIAL DIPHTHERIA EXAMINATIONS, MADE DURING EPIDEMICS

Location	Number of Cases	Number of Positive Cases	Number of Negative Cases	Number of Reserved Cases	Number of Examinations
Faribault	85	9	76	.....	117
Two Harbors	1,013	53	940	20	1,107
Worthington	622	31	585	6	858
Wrenshall	100	4	90	6	100
Cairo township	112	19	92	1	190
Santiago township	54	10	44	.....	156
Southeast Minneapolis	221	67	150	4	673
University hospital	282	19	236	27	872
Morris	408	5	399	4	457
Plainview	310	5	296	9	343
Rochester	206	3	200	3	238
University Agricultural School	408	11	364	3	1,170
University Hospital	234	24	193	17	563
Winnebago	472	56	394	22	959
Hallock	320	18	301	1	320
Minneola township	64	11	45	8	293
St. Peter	1,215	271	957	17	4,233
Fergus Falls	59	23	7	29	112
Total	6,215	670	5,369	177	12,759

This table shows some interesting features and a sufficient number of epidemics has been investigated to give almost all the possible variations that many occur so that the figures which have been obtained will be a fair index of the results which may be expected in any case from adopting this method of handling diphtheria epidemics. The population involved in the various epidemics has been of a varying character but for the most part the epidemics have occurred in schools of various kinds.

In one epidemic, namely, that occurring in Southeast Minneapolis, it was a question of a milk epidemic, and the population infected was to a certain extent limited to the driver's route, although many of the individuals infected were assembled in more or less intimate contact in the class rooms of the University. On the other hand, several epidemics occurred in hospitals, two separate and distinct ones occurring in the University Hospital and a large epidemic occurring in the hospital for the insane at St. Peter and a smaller one in a similar institution at Fergus Falls.

In analyzing the figures, it will be seen that on an average in the varying conditions that have obtained, out of every ten individuals exposed one will carry diphtheria bacilli with or without symptoms of the disease. This proportion varies, depending to a considerable extent upon the length of time that has elapsed between the occurrence of the first case and when a control of the epidemic was begun. The longer this time the higher will the percentage of individuals who will be infected. For instance, in the epidemic at St. Peter this period was probably greater than in any of the other epidemics studied and we find there the proportion of infected individuals was much larger, practically one out of every five of the total population at the institution being infected. On the other hand, in the first epidemic at the University Hospital, where the disease was early discovered, we find that the proportion was only one in fifteen. At Two Harbors, where the possibilities of infection were not quite so great as at the University Hospital, we find that the proportion is even smaller, and here we find that only one in twenty individuals were infected.

Looking at the totals which have been obtained, we find that some 12,000 examinations were made, resulting in the finding of 670 positive cases in a total number of 6,215 individuals examined; 5,369 individuals were found free from diphtheria organisms upon examination of single nose and throat cultures. From these figures it can be determined that the remaining 7,390 examinations were necessary to make a diagnosis and release from quarantine 670 individuals. Of these 7,390 cultures, 760 were single cultures, i. e., nose and throat cultures planted on one tube, and were for the purpose of diagnosis, so that subtracting these, we find that 6,630 cultures were examined to release 670 individuals. These were separate nose and throat cultures, i. e., nose and throat cultures planted on separate tubes, so that dividing by two it can be determined that 3,315 examinations were made for 670 individuals, i. e., on an average five ex-examinations were necessary to release an individual who had been quarantined, whether it was a clinical case or a case determined by laboratory examination in which clinical symptoms did not exist.

In these epidemics instructions are given to have cultures sent from those in quarantine twice a week until the first negative is obtained, when cultures for a subsequent negative are sent on the succeeding day. From this it can be determined that it took on an average fifteen days to release an individual from quarantine by the cultural method. In this state the legal time limit for diphtheria quarantine is six weeks, so that these figures demonstrate a saving of practically two-thirds of the ordinary quarantine period. It should be understood that as a rule in each one of these epidemics release from quarantine was by the cultural method, although a few exceptions did occur which will be noted in discussing the separate epidemics, but these are not of a sufficient number to alter in any way the general results.

It will not be necessary to discuss in detail each one of these separate epidemics as the same general principles have been employed in all with variations adapted for each particular locality. Several of these epidemics, however, do present features which are different from those which ordinarily obtain and these deserve a more extended description.

DIPHTHERIA EPIDEMIC IN SOUTHEAST MINNEAPOLIS.

In May, 1911, diphtheria was discovered by Dr. W. H. Condit, a local physician, in one of the boarding houses where a number of students attending the University lived. At the same time several other individuals situated in different houses came down with diphtheria. These cases appeared suddenly all about the same time in a district which previously had been free from diphtheria. Inasmuch as it became apparent that numbers of University students had been exposed, an investigation was deemed necessary. In this investigation the board of health of the city of Minneapolis, the University health and sanitary committee and the Laboratory Division of the State Board of Health all co-operated. From the distribution of the disease in the primary cases found, it became apparent that some factor other than contact was at work. All cases which occurred were found to exist on one route of a certain dairyman. These cases were not scattered throughout his entire distribution area, but were more or less limited to the immediate vicinity of the University, indicating that only a portion of his milk route was infected. Examination of the dairy was undertaken by the Minneapolis board of health, who assigned Dr. H. M. Guilford to the work. To him should be given a good deal of credit for the success with which the epidemic was treated. Cultures were taken from all individuals who had any part in the handling of the milk.

In the herd there were about thirty cows which were milked by four men, the milking being done directly into open pails. One of these four men, upon examination, was found to have granular forms of diphtheria bacilli in his throat. He had not then nor recently been suffering from sore throat or any symptoms of diphtheria. He was apparently simply a carrier of the organisms. His employment was that of milker, and he had nothing to do with the distribution of the milk throughout the distribution area. No primary cases were found who had not been supplied with milk from this dairy. Cultures were immediately taken from all consumers of milk from this particular dairy and from all individuals who had come into contact with them. The cases were scattered for the most part in the various boarding and fraternity houses in which, as a rule, a considerable number of individuals resided.

During the epidemic 673 examinations were made by this laboratory for 221 individuals, of whom 67 showed diphtheria bacilli, 150 showed no diphtheria bacilli and 4 of whom were reserved. This did not include all the examinations that were made as some examinations were made in the laboratory of the city board of health. An analysis of all the records show that during the epidemic 68 cases had some symptoms of diphtheria and showed the presence of diphtheria bacilli in their noses or throats; 30 other individuals carried diphtheria bacilli without showing any signs of the disease. There subsequently devoloped seven secondary or contact cases. The infected individuals were scattered fairly widely over Southeast Minneapolis, in many cases there being not more than one individual in a single house infected. In one instance out of a family of ten, including the nurse, nine showed diphtheria bacilli, the father alone being free from the organisms. In all, forty houses were quarantined. The first case was reported on May 19 and the first sick individual was released from quarantine on June 2 and the last one on June 25, so that the epidemic lasted less than six weeks. Of those individuals who were sick, the majority had the disease in a very mild form, only twelve being at any time very sick. There was but one death.

The epidemic is remarkable in several features. In the first place the organisms were apparently of very low virulence as only a few of the individuals infected were very sick and only a very small proportion of those exposed showed diphtheria bacilli. It should be taken into account that the primary exposure to the milk infection occurred on a Friday and that on the following Saturday and Sunday numbers of house parties had been arranged in which were gathered together groups of individuals, some one or more in almost each group having been exposed and others of whom had not been exposed to the primary infection. In addition to this, regular classes at the university were in session. In spite of all these opportunities for contact infection, there were only seven secondary cases so far as could be discovered.

The epidemic covered a very short period of time, lasting only thirty-seven days after the first case had been reported. The average length of quarantine for carriers was about eight days. The individuals showing diphtheria bacilli were rigidly excluded from all classes at the university and in this way after the epidemic was once discovered the spread was undoubtedly limited to a very great extent.

EPIDEMICS AT THE UNIVERSITY HOSPITAL.

Early in September, a case upon which skin grafting had been done was discovered in the University Hospital, complaining of a sore throat. The bacterial examination of the throat and later the bacterial examination of the wound itself showed diphtheria bacilli.

Cultures were immediately taken from all inmates and employes of the hospital and diphtheria bacilli were found in eighteen other individuals of whom five were nurses and one the house surgeon.

Inasmuch as at this time the University Hospital was just about to move from its old quarters into the new hospital, release was given only upon three successive negatives in order to exclude, if possible, any diphtheria gaining entrance into the new Elliott Memorial Hospital. In all 872 examinations were made.

Whether or not these precautions were effectual or whether a new infection occurred could not be accurately determined, but some two months later diphtheria reappeared this time in the new hospital. Cultures were taken from all of the inmates, numbering in all 234 and 24 individuals found in whom diphtheria bacilli were present.

It is probable that there were two distinct epidemics, the second one being caused by a second infection independent altogether of the first inasmuch as extreme precautions were used to be sure that no infected individuals were transferred to the new institution.

DIPHTHERIA AT THE STATE AGRICULTURAL SCHOOL.

The epidemic occurring at the Agricultural School is of special interest inasmuch as it exemplifies the successful manner in which an epidemic of this character may be handled by the use of cultures and isolation subsequent upon laboratory findings.

The origin of the epidemic at the Agricultural School could not be definitely traced. However, on November 4, 1911, a clinical case of diphtheria occurred which showed the presence of diphtheria bacilli in the membrane. On November 10, a second case was discovered and on the 12th two cases and on the 13th two cases. Cultures had been taken in a very thorough manner of sixteen individuals who had been more or less exposed and in these people up to November 13, six cases of diphtheria had been found.

The authorities at the Agricultural School became alarmed and sought assistance of the State Board of Health. An investigator, Dr. A. J. Chesley from the Epidemiological Division, was sent to the school, who took cultures from all who appeared to have been in any way in contact with any of the clinical cases which had already been discovered. These cultures were taken on November 13. The epidemic lasted from this date until December 29. From four hundred and eight persons cultures were obtained, in forty-two of which diphtheria bacilli were found. Of these forty-two, eleven were clinical cases and the remaining thirty-one laboratory cases.

It is not possible to give subsequent cultural data on all of the clinical cases inasmuch as some only were treated at the Agricultural School, others going to the different hospitals of the Twin Cities or to their nearby homes and so fell under the jurisdiction of the particular health officer where they were treated.

Some 1,200 cultures were taken in all. The epidemic lasted fifteen days after the State Board of Health took charge, with the exception of one case who became a chronic carrier. This individual had some trouble in his upper respiratory passages and retained diphtheria bacilli for a very much longer period of time.

On November 22 during the progress of the epidemic it became necessary in the school work for certain individuals to commence the study of butter making. In order to prevent any possible infection of the butter by individuals who might have been infected and who escaped notice, all who were taking this particular course were again subjected to the cultural test. In none of these were any diphtheria bacilli found so that not only the clinical history but also cultures so far as these individuals were concerned showed that they were free from diphtheria bacilli, and it also indicated that the proper selection of cases upon whom cultures should have originally been taken was a good one.

Of the first cultures that were received, two hundred and forty two in number, twenty-four showed diphtheria bacilli. Within the next four days nine more cases were discovered. From then until the end of the epidemic, twelve days in all, only three additional cases were discovered by the cultural method. These results are in marked contrast to what occurs when any other method of handling an epidemic is used.

TYPHOID FEVER.

The work of the Laboratory Division relating to typhoid fever comes under two heads: First, methods of diagnosis, and second, methods of prophylaxis.

Methods of Diagnosis: The laboratory method used in typhoid fever to assist the physician in arriving at an accurate diagnosis of the disease is the Widal reaction. In state work the obtaining of blood cultures by the various means is a difficult procedure inasmuch as it is almost impossible to transport any such blood cultures to the laboratory for incubation and subsequent determination of the bacterial content. Experiments are being undertaken with the hope of being able to devise a solid media upon which cultures from the blood or from the stools may be shipped, but up to date no medium satisfactory for this purpose has been found. In the laboratory therefore the diagnostic aid which is used is the Widal reaction.

A good deal of controversy exists concerning the wet and dry methods and between the gross and microscopic methods of doing the reaction, but there is no doubt of the fact that in state work the dry method is the one best adapted for obtaining uniform successful results. By using this method, dangers arising from breaking specimens in transit or alterations in the character of the fluid by freezing are entirely eliminated.

The outfit in use in this laboratory for obtaining the specimen has already been described in the Journal of Infectious Diseases, Supplement No. 1, page 315.

No changes either in the method of obtaining the blood or the method of making the actual test have been made, except some minor changes in the data blank which now read as follows:

TYPHOID DATA BLANK.

MINNESOTA STATE BOARD OF HEALTH LABORATORY DIVISION.
(University of Minnesota), Minneapolis.

Date and hour of collection....................................
Patient's name..........................P. O. address..........................
Patient's residence......................County of..................................
*Township, village, city.
Physician's name...................................Address.......................
Health officer's name.............................Address.......................
Has this case been reported upon before?........If so, give previous case No.......
Patient's age............Sex.........................Temperature..................
How long since disease commenced?..
What is the supposed source of infection?...
When, if ever before, has the patient had typhoid fever?
Physician's diagnosis.............Do you desire a telegraphic report?.............
*Strike out words which do not apply. Remarks (OVER)

A certain amount of difficulty had been experienced from the fact that some of the physicians were not sufficiently careful to see that the blood was dried before the packet was closed. For this reason printed across the face of the data blank in red ink is a special warning regarding this point.

In making the test in the laboratory several different strains of typhoid having satisfactory motility are kept ready. These strains have been isolated from different individuals. One strain that had been in use in the laboratory for a long time was isolated by Dr. F. F. Wesbrook from the city water. Most of the other ones have been obtained from widely different sources, one coming from Dr. Gordon Bell of Winnipeg. The organisms which are being constantly used for daily tests are sowed out on agar, incubated for twenty-four hours and then kept in the icebox for one month, after which time an inoculation is made into broth and incubation over night at room temperature allowed and the fluid is used the next day for performing the tests. A dilution of 1:50 of the serum is used instead of the dilution in 1:25 originally employed. A specimen is reported positive only when there is agglutination and a loss of motility. Where either of these factors is lacking, the specimen is reported as atypical. Where both factors are totally lacking, the specimen is reported as negative.

The reports are sent on blanks of the same size as those used in making diphtheria reports, which bear the following printing:

No. 112.

TYPHOID REPORT.

LABORATORY DIVISION MINNESOTA STATE BOARD OF HEALTH.

University Campus, Minneapolis.

Examination No..................Received..

Patient's name......................... ....Sanitary district....................

Physician's name...........................Address.... ....

Health officer' name.........................Address.............................

Widal reaction............................. ....

Remarks...

....

(Over)

Reported...

R. H. MULLIN, Director,—Per

Bacteriologist.

Copy of telegram to

On the reverse side is printed an interpretation of the results which have been obtained, which reads as follows:

Note carefully:

1. Blood must be dry when sent, otherwise opportunity for contamination is afforded, and a satisfactory examination is impossible.

2. "Present 1:50" means that the solution of one part of blood in fifty parts of distilled water has the property of arresting the motility of, and clumping typhoid bacilli added to it from a fresh culture. This indicates that the patient is now, or recently has been, infected with B. typhosus. (In over 90 per cent of such cases the patient has enteric or typhoid fever. But reactions sometimes persist from previous typhoid infection. In all cases the possibility of a latent complication or obscure infection with B. typhosus, e. g., abscess, cholecystitis, meningitis, pleurisy, etc., should be borne in mind.)

3. "Atypical" means that clumping of the added bicilli without a corresponding loss of motility or vice versa, or some other anomalous reaction is found. This may indicate:

(a) Typhoid infection is too recent to afford typical reaction. (The reaction usually appears in two to eight days after onset of symptoms.)

(b) Error in collecting blood, such as too little blood or not drying blood, both rendering accurate dilution impossible; or the introduction of extraneous materials.

4. "Absent 1:50" may indicate:

(a) Absence of typhoid infection.

(b) That it is too early in the disease for the appearance of the reaction.

Rarely the reaction is delayed beyond the second week.

A single negative report is of no diagnostic value. The evidence becomes more conclusive with each additional negative examination.

Remarks:

In all cases where the reaction is absent physicians are urged to send other specimens at frequent intervals. All cases of typhoid infection must be reported to the local health officer, if a local ordinance to that effect exists, otherwise to Dr. H. M. Bracken, secretary of the Minnesota State Board of Health, St. Paul, Minn. On request, the State Board of Health will furnish circulars of information to patients.

The work on the examination of blood from suspected typhoid patients is tabulated in Table VII:

This is particularly true in epidemics which have occurred at Mankato and Two Harbors. This is rather unfortunate because in such epidemics the exact date of the infection is usually easy to demonstrate and valuable aid might be derived concerning the number of days that elapse after infection before the Widal reaction appears, which could not otherwise be obtained for in ordinary cases of typhoid fever it is a matter of some difficulty to fix the exact infection. Should opportunity present itself investigations will be carried on in the future in order to obtain data on this point. Rather an interesting study has been in progress in the laboratory during the biennial period concerning the occurrence of the Widal reaction in individuals who have never had typhoid fever but who have been suffering from other diseases, tuberculosis being the disease that has been selected. In every case where a specimen of sputum has been examined and tubercle bacilli demonstrated, a typhoid outfit has been sent to the physician in charge of the case with the request that he obtain a specimen of blood for the Widal reaction. During the biennial period 260 specimens of such a character have been obtained in which there was no previous history of typhoid fever obtainable. Of these, 240 gave no reaction, 7 gave an atypical reaction and 13 gave a positive reaction.

During the biennial period the preparation of a typhoid prophylactic has come to form part of the routine work of the laboratory. The so-called typhoid vaccines which consist of cultures of the typhoid organism killed by heat have been prepared by this division for distribution among state institutions. At the same time, upon request, private individuals are sometimes supplied with the vaccine. The culture which is used in the production of vaccine was obtained from Dr. John F. Anderson of the Hygienic Laboratory, United States Public Health Service, and is the same that is used by the United States army. The method of preparing vaccine is that employed in the Hygienic Laboratory, and the vaccine is put up in small glass-stoppered vials, capacity 10 c.c., sealed by means of paraffine. Each vial will hold a sufficient amount of vaccine to completely vaccinate four individuals and bears a label showing the size of the dose that should be given upon each inoculation. Accompanying the vaccine is sent a letter of instruction to the physician regarding the prophylactic, which reads as follows:

ANTI-TYPHOID VACCINATION.

DIRECTIONS FOR USE AS PROPHYLACTIC.

Dosage—Three doses should be given at ten-day intervals. Each cubic centimeter contains one thousand million typhoid bacilli killed by heat and preserved with tricresol.

The first dose is one-half cubic centimeter, i. e., five hundred million; the second and third, one cubic centimeter each, i. e., one thousand million.

The vaccine should be injected into the subcutaneous connective tissue (not into the muscle or skin) of the arm, at the level of insertion of deltoid, by means of a sterilized, hypodermic needle.

Sterilization of the skin may be accomplished by using first soap and water, then alcohol, and lastly tincture of iodine.

Contra-indications—Persons not in good health, nor women at or near the menstrual period should not be inoculated. The drinking of alcoholic beverages at the time of inoculation or before full recovery should be restricted.

Reactions—The reaction, if any occurs a few hours after the inoculation. For that reason it is advisable to give the dose late in the afternoon so that it will come during sleeping period, for as a rule it does not interfere with sleep.

Local reaction—As a rule there is a slight local reaction at the point of inoculation consisting of a red and tender area varying in size from that of a pea to the palm of the hand.

General reaction—When present, shows itself by malaise, fever, headache, occasional chill, nausea, vomiting or diarrhea.

The severer reactions rarely appear in children and young people, but more commonly in those who have had typhoid fever.

Each bottle contains enough vaccine to completely inoculate four persons.
Shake the bottle before opening it each time.
Keep in cool, dark place.
Do not use vaccine after date stamped on label.
In determining the dose for those other than adults, give an amount which is in proportion to the weight, considering one hundred and fifty pounds as the weight of an adult.

TABLE VII

SHOWING ROUTINE WIDAL EXAMANITIONS

Quarter Ending	Number of Cases	Positive Cases	Negative Cases	Atypical Cases	Number of Examinations	Number Physicians	Number Localities
Dec. 31-10	573	287	266	20	755	249	191
Mar. 31-11	325	75	242	8	375	189	136
June 30-11	258	66	187	5	303	111	106
Sept. 30-11	409	163	197	49	490	186	158
Dec. 31-11	414	192	185	37	481	217	174
Mar. 31-12	274	66	203	5	316	181	122
June 30-12	280	34	246	0	336	178	125
Sept. 30-12	334	70	261	3	385	174	125
Total	2,867	953	1,787	127	3,411	....	....

Here again it should be noted that the figures given do not necessarily represent the actual number of cases of typhoid in the state during the biennial period but are simply those cases from which specimens have been sent in by the attending physician.

The relative number of specimens sent in for the corresponding periods in each year is approximately the same except the increased number noted in the quarters ending December, 1910, and March, 1911. During this time there was rather a severe epidemic of typhoid in the city of Minneapolis and hence the number of specimens sent from Minneapolis was very largely increased.

It should be noted that there is a considerable difference in the use made of the State Board of Health laboratory by the physicians of Minneapolis in the diagnosis of typhoid fever from that which obtains in the bacterial diagnosis of diphtheria. Practically all of the diphtheria work is done in the laboratory of the city board of health for the city of Minneapolis. On the other hand, from the various hospitals of the city, and from numerous physicians of Minneapolis specimens for the Widal reaction are sent to the State Board of Health laboratories. Whether or not this has been continued from the time when the facilities of the city laboratory were not adequate for the work it is difficult to determine. It must be remembered, of course, that typhoid is not a quarantinable disease and that therefore the question of quarantine by the city authorities does not arise so that such specimens can be examined in the State Board of Health laboratories without interfering with the work of the Minneapolis City Board of Health.

It is a matter of some difficulty to thoroughly impress upon physicians the true meaning of the Widal reaction. Too many are apt to believe that the failure to obtain a positive reaction on a single examination will totally eliminate typhoid fever. Such an idea, of course, is absolutely erroneous. The Widal reaction should be looked upon simply as part of the reaction which occurs in an individual inflicted with typhoid fever. It is a matter of common knowledge that clinical symptoms which are simply other evidences of reaction on the part of the individual vary, so that the clinical symptoms of all cases of typhoid fever are not the same. It is reasonable to expect, therefore, that the time of incidence of the Widal reaction will vary for exactly the same reason that the clinical symptoms vary. We do find, however, that in most cases of typhoid fever the Widal reaction will be present at some time during the course of the disease. Occasionally it does not occur until late and sometimes it occurs very early in the disease and between these two extremes there are all gradations of variation. Physicians are therefore encouraged to send in frequent specimens taken during the course of the disease.

Of course many cases of typhoid fever occur in which specimens are not sent for examination inasmuch as the symptoms of the case make a diagnosis certain without applying the aid given by laboratory diagnosis.

So far, comparatively little demand has been made upon the laboratory for this vaccine. In one instance a considerable number of individuals were vaccinated at one time Major Butts, commandant of the University Cadet Corps, requested that such of the university cadets as volunteered should be given the benefits of this method of protection against typhoid fever. During the month of May, 1912, 135 cadets were inoculated. In only two instances was the reaction sufficiently severe to cause the student to remain from the classes on the following day and in each case this severe reaction was present only following the first inoculation. So far as can be learned at the time of writing, none of the students who were inoculated, have subsequently come down with typhoid fever, although it cannot be ascertained that any of them were definitely exposed to the disease.

During the coming biennial period it is hoped that a more general use of this protection against the disease will come into use throughout the state. Undoubtedly where a vaccine can be prepared at such a small cost to the state, it should have free distribution to any citizen within the limits of the state.

TUBERCULOSIS.

The work in tuberculosis in the laboratory is limited to a considerable extent to the examination of sputum from individuals in whom pulmonary tuberculosis is suspected. There are examined in addition from time to time specimens of cerebro-spinal fluid in which there is a possibility of infection by the bacillus of tuberculosis or the diplococcus intracellularis meningitidis. The number of these, however, is comparatively small. Specimens of exudate of various kinds are not examined for tubercle bacilli, inasmuch as the danger of the spread of the disease from such exudates is comparatively small. The work in the examination of sputum is tabulated in table VIII.

TABLE VIII

SHOWING ROUTINE EXAMINATIONS OF SPUTUM SUSPECTED OF TUBERCULOSIS

Quarter Ending	Total Cases	Positive Cases	Negative Cases	Reserved Cases	Total Examinations	Physicians	Locations
Dec. 31-10	238	58	179	1	256	134	178
Mar. 31-11	324	89	235	0	344	176	240
June 30-11	360	72	286	2	395	175	247
Sept. 30-11	219	58	161	0	242	129	166
Dec. 31-11	230	61	166	3	248	141	167
Mar. 31-12	355	86	269	0	399	....	....
June 30-12	349	77	272	0	371	....	....
Sept. 30-12	284	75	209	0	307	170	218
Total	2,359	576	1,777	6	2,562	....	....

For sending specimens of sputum a special outfit has been designed, which has been approved by the United States Postal Department. It consists of the regulation double mailing case, the outer one being made of a stiff bristle board provided with a screw cap and bearing a wrapper with the address of the laboratory printed thereon. The outer case contains in addition to the inner case, a sputum data blank which bears the following printing:

SPUTUM DATA BLANK

Minnesota State Board of Health Laboratories
(University of Minnesota), Minneapolis

Reserved for Laboratory Use
Rec'd........................
Examined........................
Result........................

Name........................ Age........ Sex........ Color........

Residence........................ County of........................Minn.
(Township, Village or City)

Occupation........................ Married, Single, Widowed.
(Cross out all except proper ans.).

In returning the occupation of a man, do not use indefinite terms.

In returning the occupation of a woman, remember that tuberculous women abandon their occupations much earlier than do tuberculous men.

The occupation to be named is of the patient at the time the disease appeared.

Nationality........................

Birthplace........................

Pulmonary form
Coughing, how long? Location of Lesions...... (Lungs, Lymph Glands, Peritoneum, Intestines, Genito-Urinary Tract, Meninges, Skin, Bones.
Expectorating? (Yes or No)........ (Cross out all of the above except the proper answer.)

Stage of disease........................How long tuberculous?........................

Have tubercle bacilli been demonstrated as present? (Yes or No.)

If so, When?........................By Whom?........................

Filled out by........................of........................Minn.

Date of Collecting Sputum........................19....

Instructions for the collection of sputum are also enclosed, which read as follows:

R. H. MULLIN, M. D., Director.

SPUTUM: GENERAL INFORMATION.

MINNESOTA STATE BOARD OF HEALTH LABORATORIES.

(University of Minnesota), Minneapolis.

The State Board of Health makes free examinations of sputum from patients suspected of tuberculosis, as follows:

(1) Patients must be residing in the state of Minnesota at the time of examination.

(2) The examination usually made for tubercle bacilli in sputum will be the microscopic; guinea pig inoculations of sputum for tubercle bacilli, if repeated microscopic examinations fail, will be done only on request of the physician and then at the discretion of the laboratory.

(3) Examinations of sputum for bacteria other than tubercle bacilli, and examinations of pus, urine, pleural or peritoneal exudates, etc., for tubercle bacilli are not included in the scope of the work done in this service, since the results of such examinations have little bearing on the spread of infection to others.

(4) The outfit must be sent, PREPAID, by mail or express.

(5) The directions given on back of sputum data blank for collecting and shipping the sample and data must be carried out specifically as given to avoid delay and general dissatisfaction. Failure to conform with these directions in detail will constitute valid reason for refusing examination.

(6) Should the outfit arrive at the laboratory with the sputum leaking or the data blank lost or defaced, no diagnostic report will be made and the whole outfit will be immediately destroyed.

(7) The outfit consists of:

(a) The mailing case (approved by the U. S. Postoffice Department).

(b) The data blank, and these directions, wrapped about the sputum container.

(c) The sputum container, which is a wide-mouthed glass bottle and corked. This container carries a label for the patient's name, address and the date.

The inner case, made of tin and provided with a screw cap, contains a specially devised sputum receptacle consisting of a wide-mouthed vial without a neck, into which there is placed a tight-fitting cork stopper, and bearing a label with blank spaces for the patient's name and address and the date of obtaining the specimen. These outfits have been found to be entirely satisfactory for the work. Occasionally the physician, unaware of the fact that the laboratory provides such receptacles, sends in specimens in miscellaneous outfits. The first time such an event occurs the physician is notified of the existence of the mailing outfit, at the same time the report is sent him. If the same physician errs a second time, the examination of the sputum is not made.

Reports on the results of the bacterial examination are made on blanks of the following form. They are of a size uniform with the report blanks used for typhoid and diphtheria and are filed in envelopes similar to those used for diphtheria previously described. The filing methods are the same as those used for the other two diseases.

SPUTUM REPORT.

LABORATORY DIVISION, MINNESOTA STATE BOARD OF HEALTH.

University Campus, Minneapolis.

Copy of telegram to

............................Received..
Patient...Sanitary district...................
Physician.......................................Address............................
H. O...Address............................
Tubercle bacilli...
....
Remarks..
....☞ Read the regulations
Reported...(OVER)

R. H. MULLIN,
Director.—Per
Bacteriologist.

The reverse side of the sputum report bears the following printing:

Note carefully:

"Tubercle bacilli present" indicates tuberculosis, and that the discharges of this patient are dangerous to the public.

"No tubercle bacilli found" in the sputum of a patient suspected of having pulmonary tuberculosis may be explained by one of the following statements:

(a) The disease is in an early stage before the tubercles have commenced to break down.

(b) The avenues through which the bacilli pass from the active lesions into the sputum are temporarily occluded or have been closed by the process of tissue repair.

(c) This specimen contained so few bacilli that they could not be found by the careful microscopic examination of several smears.

(d) The patient is not tuberculous.

DO NOT BE SATISFIED WITH ONE NEGATIVE REPORT. Send in other specimens and disregard all negative reports unless they are confirmed by repeated physical examinations and careful observation of the patient, including temperature records, over a considerable period of time.

The physician may supplement his advice and suggestions by distributing special literature bearing upon the nature and curability of the disease. This literature is furnished free of charge upon application to the secretary of the

State Board of Health. The use of such literature may often protect the physician from a suspicion on the part of patients that he is placing undue stress upon the disease and its dangers to themselves and others.

☞ ALL CASES OF TUBERCULOSIS MUST BE REPORTED ☜ to the local health officer, if a local ordinance to that effect exists; otherwise to the secretary of the State Board of Health, State Capitol, St. Paul, Minn.

It has been found that frequently there has been a tendency on the part of some physicians to misinterpret negative findings in suspected tuberculous sputum. For this reason a special warning card is sent with a negative report, printed in red so as to be especially conspicuous which bears the following printing:

FROM THE MINNESOTA STATE BOARD OF HEALTH.

WARNING.

Interpretation of Negative Reports on Suspected Tuberculosis Sputum.

Failure to demonstrate tubercle bacilli in the sputum of cases suspected of tuberculosis, does not eliminate the possibility of the patient being tuberculous. Repeated bacteriological examinations should be made so long as the suspicious symptoms continue. All methods of diagnosis known;—physical examination, tuberculin reaction, etc., should be tried in each case. By the careful application of such methods, it is frequently possible to diagnose pulmonary tuberculosis before the bacilli appear in the sputum. Their appearance in the sputum indicates an actual destruction of lung tissue, one of the LATER manifestations of the disease. MAKE AN EARLY DIAGNOSIS SO AS TO EFFECT A CURE.

With all positive reports, circulars of information for the use of the patient and the patient's family are sent to the physician in charge of the case, with a printed card which bears the following printing:

FROM THE MINNESOTA STATE BOARD OF HEALTH.

RECOMMENDATION TO PHYSICIANS.

We are reporting to you the positive findings on sputum submitted by you for examination. With this report we are sending you circulars of information for the use of the patient and the patient's family. These are sent to you rather than to the patient direct, in order that you may exercise your judgment in presenting them to the family.

The presence of tubercle bacilli in the sputum, as shown by the laboratory findings, proves beyond doubt that this particular patient is a menace to others unless constant precautions are taken, as set forth in the circulars. This is the primary and important reason for sending these circulars, i. e., to prevent the further spread of infection.

These include circulars 89, 90 and 93, issued by the Minnesota State Board of Health and also a pamphlet on personal defense against tuberculosis.

The technique usually employed in the search for tubercle bacilli in sputum is the well known Ziehl-Neelson method. Certain modifications have been added to this. Every specimen of sputum that arrives in the laboratory is first submitted to this test. In all those in which tubercle bacilli are found, reports are immediately sent to the physician. Where tubercle bacilli are not found by the Ziehl-Neelson method, the concentration method of Ellermann-Erlandsen is employed. By this means we are able to demonstrate tubercle bacilli in a certain number of specimens of sputum where they are not shown by the Ziehl-Neelson method alone. Of such specimens in which no tubercle bacilli were found by the Ziehl-Neelson method, 1,429 were examined during the biennial period and of these upon submission to the concentration process thirty-five became positive. Not all specimens of sputum received were submitted to this process on account of the rush of other laboratory work. This particular investigation has been in the hands of several different laboratory workers and varying results have been obtained. It would appear that where a very careful search is made, using the Ziehl Neelson process alone, that practically no positive cases will be missed, whereas a less careful observer will find tubercle bacilli in the concentration method where he has failed by the Ziehl-Neelson method. The investigation is being continued until a larger number of examinations can be made.

SPINAL FLUIDS.

Examination of fluids obtained by lumbar puncture is made from time to time upon request of the attending physician, especially in those cases where epidemic cerebro-spinal meningitis is suspected. For the purposes of collecting spinal fluid a special outfit has been devised by Dr. A. J. Chesley, a description of which is found in American Journal of Public Health, Vol. 1, No. 2. During the biennial period twenty-nine spinal fluids have been examined. In two cases the diplococcus intracellularis meningitis was demonstrated and in one case tubercle bacilli were discovered.

SPECIAL INVESTIGATIONS.

During the biennial period three cases of leprosy have been investigated. Following the methods advocated by Duval, it has been found possible to cultivate leprae bacilli from each of the three cases. In one instance cultures were obtained from "scabs" which covered some of the superficial lesions, showing that such incrustations were capable of carrying living bacilli. One of the cases was an individual who came to autopsy and the living bacilli were obtained from skin lesions and lesions of various other organs in the body. In each case bacilli were demonstrated first by direct microscopic preparations, using the Ziehl-Neelson method of stain.

DYSENTERY AT WELLS.

In August, 1911, an epidemic of a rather severe type of dysentery occurred at Wells, Minn., and the neighboring vicinity. An investigation was undertaken by the Laboratory Division in co-operation with the Epidemiological Division. Wells was visited by a representative of the Epidemiological Division and a preliminary survey of the situation did not seem to indicate definitely whether the disease was of an amoebic or bacillary origin. An investigator from the Laboratory Division was sent to Wells equipped for the purposes of making a bacteriological and parasitic investigation. Preparations made direct from the feces of some of the severe available cases in Wells failed to show any evidence of the presence of amoeba. Cultures were made at the same time from these and there was isolated a strain of bacilli resembling the Flexner type of the dysentery bacillus in every respect except that they failed to be agglutinated by its hemolygous serum. Nevertheless it is probable that the disease in question was caused by this particular organism.

CHEMICAL LABORATORY.

The work of the Chemical Laboratory comprises:

1. Investigations on the sanitary quality of water supplies.
2. Investigations on the sanitary quality of ice supplies.
3. Investigations on "certified" and "inspected" milk.
4. Investigations on sewage problems.
5. The examination of embalming fluids.

INVESTIGATION ON THE SANITARY QUALITY OF WATER SUPPLIES.

On account of the limited amount of funds which have been placed at the disposal of the board for this purpose, the work on the investigation of the sanitary quality of water supplies has been limited to those cases where a large number of individuals receive their water supply from a common source. The desirability of giving any individual exact knowledge concerning the potability of any individual well is not denied; it is simply a question of funds and workers available to make the investigation. However, during any epidemic of an infectious disease where there seems to be evidence that individual well or wells may have some part in the spread of the disease, investigation of such wells is undertaken. Any investigations made by the laboratory are without cost to the locality. Where a public water supply is involved, an investigation will be undertaken either for the purpose of giving advice on a proposed water supply or to determine the sanitary quality of the one which has already been installed. In addition, where there has been an attempt to insure for the consumers a pure water by the installation of a purification plant of any description, investigations to determine to what extent the purification plant is doing its duty are made. From time to time as the necessity arises, special water problems are taken up, especially where the information to be derived is for the use of the Board.

In the routine investigations of public water supplies a request for such investigations should be sent to the Secretary and Executive Officer of the Board by the authorties who desire such investigations. This request should be accompanied by a statement showing the reasons for desiring such an investigation. The Executive Officer then determines upon the advisability of making the investigation and assigns the work to the proper division of the Board. Where a request comes to any division of the Board, it is immediately referred to the Executive Officer for instructions. It is only upon instructions from the Executive Officer that the Laboratory Division undertakes any investigations regarding water supplies. Reports on all investigations are made to the Executive Officer who transmits the same to the proper authorities. Accompanying each report is a formal letter of transmissal showing the date at which the investigation was begun and upon whose request it was undertaken. Where special features in the report deserve attention, they are noted in brief in this letter of transmissal.

Methods.—Experience has shown that only when certain definite methods are followed in the investigation of all water supplies can any uniform data be obtained which can be compared and the full value to the state obtained for the effort made in undertaking the various investigations. It is obvious that investigations on water supplies should be undertaken only by individuals who have had considerable experience and training in this particular line of work. An investigation of any water supply should include a field investigation to determine the exact environmental conditions surrounding the water supply, and an analytical determination made after the field investigation has been completed but begun during its progress.

Among individuals who have not a sufficient knowledge of the subject, there is a current belief that a simple chemical or bacteriological examination on samples promiscuously collected and shipped to the laboratory may be used to determine the sanitary quality of a water supply; and they are apt to place too much importance upon such examinations, using them as the sole basis for forming an opinion of a given water supply. It requires but little thought to appreciate that in many instances analytical determinations occupy relatively a minor position among the data that are collected in proper water investigations. As a general rule it is usually possible from a field examination to obtain a fairly accurate idea of the sanitary quality of a given water supply. In proper and adequate methods of investigation, a field survey should first be made and analytical results used to verify and supplement, when necessary, the information that is derived from inspection. There are, of course, certain instances where the analytical results are of the very greatest importance and over-shadow altogether the field inspection; but such cases are comparatively rare and may be treated as exceptions.

It is obvious that in order to obtain the best results both field and analytical determinations should be in the hands of one department. In some instances where emergency arises it may be necessary for the field investigation to be made by one individual and the analytical investigation by another; but experience has shown that in such cases the full value of the investigation is difficult to obtain, inasmuch as when an observer who is not especially trained attempts to undertake a field investigation he will frequently omit factors which have the utmost importance and without which it is almost impossible to adequately interpret and apply the results obtained in the laboratory. The idea that the field examination is limited merely to the collecting of the samples is entirely erroneous. We have found that where samples are collected promiscuously it is difficult, if not impossible, to obtain from the collector any adequate idea of the field data which are necessary for the proper interpretations of results, although such a collector may have been supplied with an outline of the information that is required, and although he may have had some training in bacterial work.

The variety of data that is collected by this laboratory from a field investigation can be surmised from the following outline which forms the basis upon which all field investigations are made. This outline has been drawn up in order to promote the obtaining of uniform data in all field investigations, and is of such a character that it will include almost any water supply. It can be expanded at any point where necessary in order to accommodate itself to particular conditions which may exist at any particular locality without interfering with the general arrangement. It requires little explanation:

INSPECTION DATA ON WATER SUPPLIES.

I. Identification data.
    A. Date of visit.
    B. Ownership, private or public.
    C. Location.
        (1) Rural, range, county, township, section, etc.
        (2) Urban, city, town, village, street, number, etc.

- D. Size of site, square miles acres or feet.
- E. Use of site, residence, manufacturing, farming, etc.
- F. Sketch.
  - (1) Topography, character of surface, drainage, etc.
  - (2) Location of, water supply, buildings and factors affecting quality of water supply.
- G. Photographs, cases of unusual interest.

II. Local and structural water data.

- A. Source of water supply.
  - (1) Wells.
    - (a) Location.
    - (b) Type.
    - (c) Depth.
    - (d) Strata.
    - (e) Casing.
    - (f) Well pit (casing and dimensions).
    - (g) Covering.
    - (h) Method of drawing water.
    - (i) Yield.
    - (j) Permanence of supply
    - (k) Use.
    - (l) Abandoned wells.
    - (m) Sanitary aspect (environment and defects in structure and operation, etc.)
  - (2) Cisterns; same as (1), omitting (f) and substituting capacity for (c).
  - (3) Springs; same as (1), omitting (c) and substituting spring pit for well pit in (f).
  - (4) Rivers.
    - (a) Name.
    - (b) Source.
    - (c) Size.
    - (d) Character of basin, topography, geology, populated, etc.
    - (e) Contaminating factors, sewage, trade wastes, etc.
    - (f) Use of water.
    - (g) Method of drawing water.
    - (h) Local sanitary aspect.
  - (5) Lakes, same as (4).
  - (6) Ponds, same as (4).
- B. Methods of purification.
  - (1) Impounding.
    - (a) Reservoirs, location, type, size, capacity, possible factors of contamination.
  - (2) Sedimentation.
    - (a) Reservoirs, same as (1) (a).
    - (b) Preliminary chemical treatment, chemicals used, describe apparatus used for applying chemicals and amount used.
  - (3) Filtration.
    - (a) Description of plant, including location, type, size, mechanical devices and appliances.
    - (b) Mention other methods combined with filtration.
    - (c) Describe operation of plant.
  - (4) Hypochlorite treatment.
    - (a) Describe administering plant.
    - (b) Determine accurately the amount of available chlorine applied to the water.
    - (c) Describe operation of the plant.
  - (5) Copper-sulphate treatment.
    - (a) Describe method of application and devices, if any used.
    - (b) Amount applied in proportion to water treated.
    - (c) Apparent result from treatment, if any.
- C. Storage of water supply.
  - (1) Reservoir or tank.
    - (a) Location.
    - (b) Structure (wood, steel, concrete, etc.)
    - (c) Capacity.
    - (d) Elevation.
    - (e) Covering.

(f) Gravity or pressure distribution.
(g) Sanitary aspect.
  When cleaned last and how.
  Decomposition of structure in contact with water.
  Character of sediment on bottom or sides.

D. Distribution system of water supply.
  (1) Length and size of mains or piping system.
  (2) Number of hydrants and taps.
  (3) Sanitary aspect.
    (a) Relation to sewer system, cesspools, etc.
    (b) Sediment in pipes.
    (c) Previous or present infection of system.
    (d) Previous or present disinfection of system.
    (e) Other sources connected for fire protection.

E. Consumption of water.
  (1) Average and maximum daily consumption.
  (2) Number of people supplied.
  (3) Per cent of total number.

F. Sampling points.
  (1) Exact location.
  (2) Reasons for selecting these points.

During the progress of the field investigation, the analytical investigation is begun by collecting samples. Experience has taught that the full value of analytical results can only be obtained when the laboratory work is begun within a very short time after the actual samples have been collected. By this means the true bacterial population of the water may be obtained, as the change in numbers which will occur during transportation will be eliminated. With this idea in mind, it is our custom in each case to begin the laboratory work actually on the field. For this purpose a field outfit has been devised. Various modifications have been added from time to time as their necessity was pointed out until an outfit fairly complete and satisfactory for work of this character has finally resulted. Such an outfit has already been described.* Since this description little has been changed in the outfit except to alter slightly the material of which the case is constructed, so as to provide a lighter piece of apparatus more easily portable and having a somewhat better appearance. One-half-inch bass wood is used and the edges and corners of the box amply protected with brass and iron. Cases of similar appearance have been constructed to hold one-gallon glass stoppered bottles for collecting samples for chemical analysis. Either case may be carried by hand or shipped.

In the collecting of samples for bacteriological examination, a certain amount of difficulty is experienced in getting a fair sample of the water. It is obvious that in lakes and streams the bacterial count will vary to a certain extent with the depth at which the sample is taken. It is necessary, therefore, in order to get an adequate idea of a bacterial content to take samples at different depths. For this purpose a sampling rod was devised by Dr. H. W. Hill, formerly assistant director of this division. This rod is based on the principle of a jointed fishing rod. The rod is made of ½-inch brass tubing cut in two-foot lengths so as to fit an ordinary suit case. Any number of lengths may be provided. There is in addition a special device of simple design for removing the glass stopper from the bottle. By means of this apparatus samples can be obtained at varying depths. A ground glass stoppered XX ware bottle, capacity 4 ounces, is used as a sampling bottle. A data blank is filled out for each sample, which has the following form:

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*See Bulletin No. 154, page 18, Bureau of Plant Industry, United States Department of Agriculture.

LABORATORY DIVISION

MINNESOTA STATE BOARD OF HEALTH.

Water and Sewage Sample Data Card.

Spec. No. ....
Material collected ....
Town, etc. ....
Map location ....
Specific location ....
Source of material ....
Collected by ....
Date and Hr. Coll. ....
Temp. ....1. Air....................2. Water.................
Kinds of samples ....
Date and Hr. plated ....
Plated by ....
Date and Hr. shipped ....
Date and Hr. received ....

Map location—Street, number, etc., of house, pumping station, etc.

Specific location—Name and place of well, faucet, etc., i. e., relative position to house, etc.

Material collected—Nature of sample, i. e., water or sewage.

Source of material—City supply, river, private well, etc.

That part of the bacteriological work commenced in the field consists in pouring plates, following the standard methods using 1 c.c. and O. 1 c.c. amounts and making dilutions where necessary. This gives an accurate idea of the exact numerical bacterial content of the water at the time, so that no account has to be taken of variations due to changes of bacterial content during transportation. At the same time 1 c. c. of the water is mixed with from 1 to 2 c. c. of molten agar and allowed to solidify. Upon its arrival at the laboratory it is broken up with a twisted No. 14 gauge (Brown & Sharp) aluminum wire and emptied into a lactose broth fermentation tube which is then incubated. The wire used for this purpose is sterilized in a test tube in a hot-air sterilizer and is of sufficient length to conveniently go to the bottom of an ordinary test tube. This fermentation tube is used for the isolation of colon bacilli when the presumptive test indicates its presence.

The bacteriological methods which are subsequently employed are those recommended by the Committee on Standard Methods of Water Analysis of the A. P. H. A., 1905, with the following exceptions:

(1) Agar is used instead of gelatin for counts.

(2) Incubation is at room temperature and for four days from time of plating. If less than four days were established as a limit, plates would often be received in the laboratory so long after plating that the allowed incubation period would already have been exhausted in transit.

(3) The colon tests recommended alternatively as procedure A and procedure B by the committee on standard methods of water analysis of the American Public Health Association are both employed, the former on 100 c.c. samples enriched by quadruple strength broth and incubated, the latter on 1 c.c. samples prepared in the field, which is also an enrichment method. (a)

(4) The preparation of media follows strictly the committee's recommendations except in the following details:

Plain nutrient broth. Sterilized in an autoclave.

Dextrose broth. The muscle sugar removed by colon bacilli.

Milk. Owing to variability of ordinary milk the following substitute is used: Artificial milk.*

*American Journal of Public Health, volume II, No. 3, page 162.

(5) From all the dilutions made those plates are selected which yield counts of not much above 200, all that are higher being disregarded. If deep well waters or other waters normally showed counts below 40 to each cubic centimeter, several plates are made and the results averaged.

The chemical examinations are all made following the methods recommended by the same committee. The bacteriological results for each specimen are tabulated upon detail sheets of the following form:

Water and Sewage
Bacterial Detail Sheet

MINNESOTA STATE BOARD OF HEALTH
Laboratory Division

DETAILS OF BACTERIAL EXAMINATION
of____________________

Town, etc______________________________Specific Location______________________________

Map Location______________________________Source______________________________

Specimen No.____________________Date Examined______________Examined by____________________

Bacterial count = per c. c.______________________________Date counted____________________

	Amnt.	Amnt.	Amnt.	Amnt.	Count	Medium	Temp.	Time		

Bacillus coli = in 1 c. c.

Bacillus coli = in 100 c. c.

Preliminary Cultivation

Medium	Date	Remarks
Agar Shake______		
Result______		
A. S. Ferm. Tube______		
Result______		
A. S. F. T. Plates______		
Result______		
Replates______		

Preliminary Cultivation

Medium	Date	Remarks
Broth and Water______		
Result______		
B. Ferm. Tube______		
Result______		
B. F. T. Plates______		
Result______		
Replates______		

DETAILS OF BACTERIAL EXAMINATIONS, Continued

	Cultures Isolated						
Pure Cultures	A	B	C	D	E	F	G
L. L. Agar; Color							
Morphology							
Gas: Amount							
Acid							
$H:CO^2$							
Morphology							
Motility							
S. F. Broth							
Lit. Milk							
Gelatin							
Potato							

	Cultures Isolated						
Pure Cultures	1	2	3	4	5	6	7
L. L. Agar; Color							
Morphology							
Gas: Amount							
Acid							
$H \cdot CO^2$							
Morphology							
Motility							
S. F. Broth							
Lit. Milk							
Gelatin							
Potato							

Color += red.
Morph. += Bacillus, proper size and shape, without spores.
Motil. += slight motility, ++= marked, +++= very rapid.

S. F. Broth += indol present.
Lit. Milk += red or decolorized, and coagulated.
Gelatin += no liquefaction.

The chemical detail sheets have the following form:

Water and Sewage
Chemical Detail Sheet

MINNESOTA STATE BOARD OF HEALTH
Laboratory Division

DETAILS OF CHEMICAL EXAMINATION

of____________________

Town, etc.____________________ Specific Location____________________

Map Location____________________ Source____________________

Specimen Number Date Examined Examined by

Temp. Deg. C.	Turbidity	Color	Odor		Tint and Shade in Percentages of				
			20° C.	90° C.	Red	Yellow	Blue	White	Black

TOTAL HARDNESS Amount taken=200 c. c. N/10 Soda Reagent= N/20 H_2SO_4= Parts ($CaCO_3$)=	ALKALINITY Amount taken=25 c. c. N/50 H_2SO_4= Parts ($CaCO)_3$=	INCRUSTANTS Amount taken=1000 c. c. Total Hardness= Alkalinity= Parts=	FREE AMMONIA Amount taken= c. c. 1st 50 c. c.= 2nd 50 c. c.= 3rd 50 c. c.= __x__=Parts=
ALBUMINOID AMMONIA Amount taken= c. c. 1st 50 c. c. = 2nd 50 c. c. = 3rd 50 c. c. = 4th 50 c. c. = 5th 50 c. c. = __x__=Parts=	ORGANIC NITROGEN Amount taken= c. c. 1st 50 c. c. = 2nd 50 c. c. = 3rd 50 c. c. = 4th 50 c. c. = __x__=Parts=	TOTAL NITROGEN Amount taken=1000 c. c. N. as Org. Nit.= N. as Free NH_3= N. as Nitrites= N. as Nitrates= Parts=	TOTAL RESIDUE Amount taken=100 c. c. Wgt. Dish+Res.= Wgt. Dish = Wgt. Res. = Parts=
FIXED RESIDUE Amount taken=100 c. c. Wgt. Dish+Res.= (after ignition) Wgt. Dish= Wgt. Res.= Parts=	LOSS ON IGNITION Amount taken=100 c. c. Wgt. Total Res.= Wgt. Fixed Res= Wgt. Res.= Parts=	SUSPENDED RESIDUE Amount taken=100 c. c. Wgt. Total Res.= Wgt. Total Res.= (filtered) Wgt. Res.= Parts=	DISSOLVED RESIDUE Amount taken=100 c. c. Wgt. Total Res.= Wgt. Susp. Res.= Wgt. Res.= Parts=

DETAILS OF CHEMICAL EXAMINATION, Continued

Determination	Parts	c. c. taken	Reagents	c. c. taken	Determination	Parts	c. c. taken	Reagents	c. c. taken
Nitrites			Sulphanilic Acid Amidonaphthalene		Oxygen Consumed			Sulphuric Acid Pot. Permang Amm. Oxalate Pot Permang.	
Nitrates			Phenolsulphonic Acid Ammonium Hydrate		Free Carbonic Acid			N/22 Na_2CO_3	
Chlorine			Silver Nitrate Potassium Chromate		Calcium				
Iron			Dilute HCl. Pot. Sulphocyanide		Magnesium				
Acidity			N/50 Na_2CO_3		Fats				
Dissolved Oxygen			N/10 Sod. Thiosulph. Capacity of bottle		Putrescibility				

The results are summarized on the following form: A separate column is used for each sample collected.

MINNESOTA STATE BOARD OF HEALTH
LABORATORY DIVISION

RESULTS OF ANALYTICAL EXAMINATION OF..........

Town, etc...............................**Specific Location**..........................

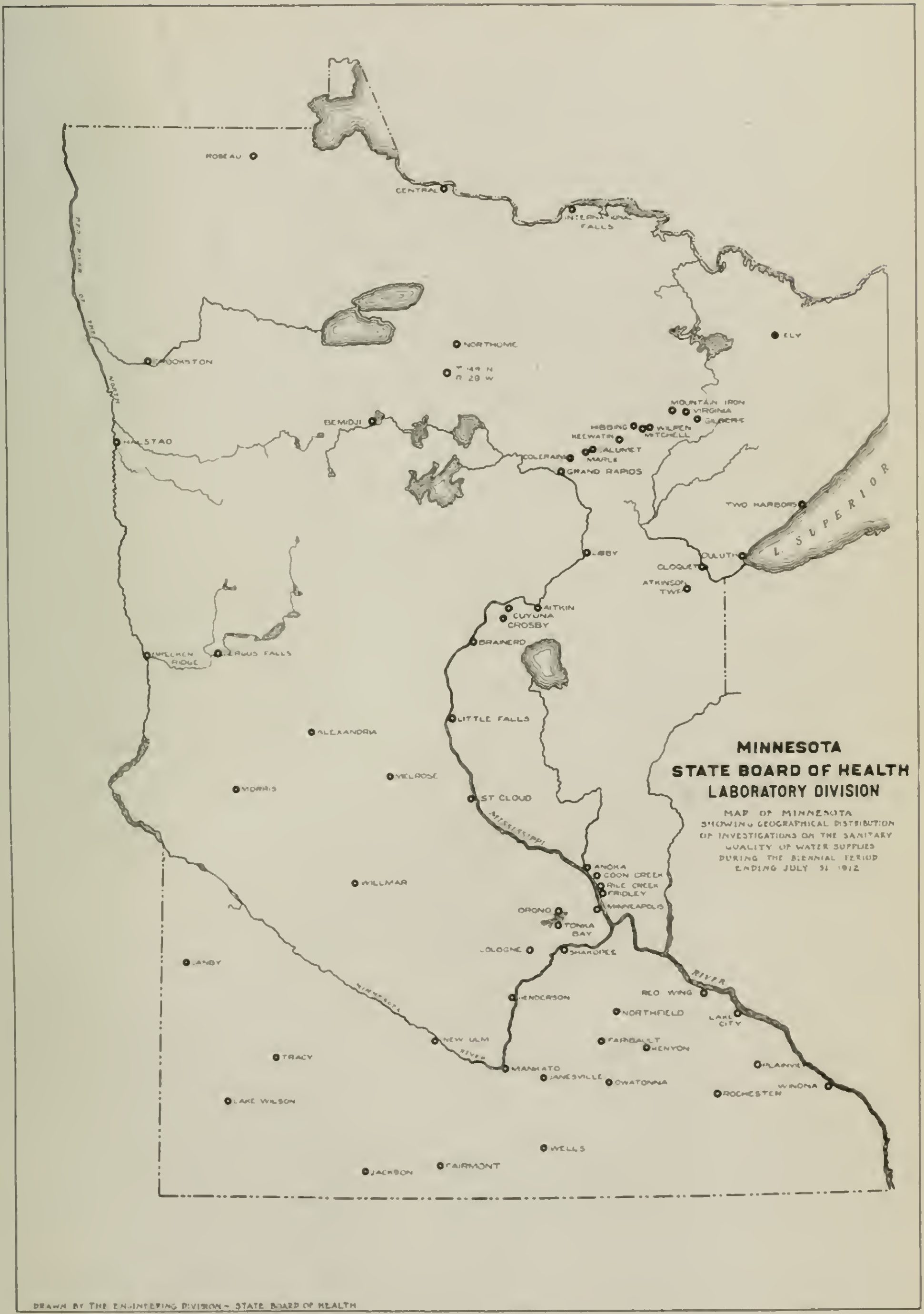
Map Location..............................**Source**..............................

Specimen number						
Collected by						
Date collected						
Date reported						
BACTERIAL: exam. by						
Bacteria, per c. c.						
B. Coli						
PHYSICAL: exam. by						
Temperature						
Turbidity						
Color						
Tint and shade						
Odor at 20°c: at 90°c.						
CHEMICAL: exam. by						
(parts per million)						
Total hardness	W.					
Alkalinity	W.					
Incrustants	W.					
Albuminoid ammonia	W.					
Free Ammonia	S.W.					
Organic nitrogen 1	S.W.					
Nitrites	S.W.					
Nitrates	S.W.					
Chlorine	S.W.					
Total nitrogen	S.					
Total residue	S.					
Fixed residue	S.					
Loss on ignition	S.					
Suspended residue 2	S.					
Dissolved residue	S.					
Iron 5	S.					
Acidity 4	S.					
Dissolved oxygen 4	S.					
Oxygen consumed	S.					
Fats	S.					
Putrescibility 4	S.					
Free carbonic acid 4, 5						
Calcium 3						
Magnesium 3						

1. Except ground waters. 2. And turbid waters. 3 Softened waters only. 4 And highly polluted waters. 5. And ground waters.

The report includes the detailed field data, the summarized analytical results, followed by an interpretation of the findings together with such recommendations as are apparently warranted.

During this biennial period a total of 202 investigations on different o rthe same supplies, were undertaken either by this division alone or in co-operation with other divisions of the Board. These investigations were made for 66 different localities as shown by the map. In some instances more than one investigation was made at different times on a single water supply. This work has necessitated the examination of 691 samples of water. In the examination of these samples 675 bacteriological and 224 chemical analyses were made. Of the total number of investigations made, in 72 cases it was determined that the water supply was of questionable character or unfit for public consumption. It should be understood that this work is limite dto a large extent, to those cases where an investigation has been solicited by the local authorities as the available funds do not permit of a general survey of the water supplies of municipalities throughout the state. Such a general survey would be of inestimable value in insuring the proper sanitary installation of water supplies throughout the state, and is one of those necessities which is becoming more urgent every day. By such a process, it would be possible to provide municipalities with advice which would tend to prevent water supplies becoming contaminated. The present method of waiting for solicitation is at best merely palliative and is effective only for the particular municipality involved, and then, usualy only after some trouble has arisen. The distribution of such water investigations by locality is shown by the succeeding map.



MINNESOTA
STATE BOARD OF HEALTH
LABORATORY DIVISION

MAP OF MINNESOTA
SHOWING GEOGRAPHICAL DISTRIBUTION
OF INVESTIGATIONS ON THE SANITARY
QUALITY OF WATER SUPPLIES
DURING THE BIENNIAL PERIOD
ENDING JULY 31 1912

DRAWN BY THE ENGINEERING DIVISION – STATE BOARD OF HEALTH

TABLE

SHOWING A SUMMARY OF INVES

COUNTY	Locality	Date of Investigation	Supply	Source
Aitkin	Aitkin	Jan. 6, 1911	Public	River
Aitkin	Aitkin	Jan. 6, 1911	Public	Well
Aitkin	Libby	April 12, 1912	School Dist. No. 94	River
Anoka	Anoka	Feb. 7, 1911	Public	River
Anoka	Anoka	Feb. 24-28, 1911	Public	River
Anoka	Anoka	May 11, 1911	Public	River
Anoka	Anoka	May 30, 1912	Private	Wells
Beltrami	Bemidji	July 25, 1912	Public	Wells
Blue Earth	Mankato	Aug. 15, 1910	Public	Wells
Blue Earth	Mankato	Mar. 7, 1911	Public	Wells
Blue Earth	Mankato	July 26, 1911	Public	Wells
Blue Earth	Mankato	Nov. 17, 1911	Public	Wells
Blue Earth	Mankato	July 11, 1912	Public	Wells
Brown	New Ulm	May 16, 1911	Public	Wells
Brown	New Ulm	Nov. 22, 1911	Private	Wells
Carlton	Atkinson Twp	Oct. 2, 1911	Private	Wells
Carlton	Cloquet	Sept. 24, 1910	Public	Springs
Carlton	Cloquet	Nov. 21, 1910	Public	Springs
Carver	Cologne	Sept. 12, 1911	School	Wells
Crow Wing	Brainerd	Nov. 18, 1910	Public	River
Crow Wing	Brainerd	Dec. 5, 1911	Public	River
Crow Wing	Brainerd	May 30, 1912	Public	River
Crow Wing	Brainerd	June 13-14-15, 1912	Public	River
Crow Wing	Brainerd	June 21, 1912	Public	River
Crow Wing	Brainerd	June 22 and 24, 1912	Public	River
Crow Wing	Crosby	Feb. 10, 1912	Mine	Mine
Crow Wing	Cuyuna	July 23, 1912	Public	Wells
Douglas	Alexandria	Sept. 15, 1911	Public	Wells
Douglas	Alexandria	Nov. 21, 1911	Public	Wells
Goodhue	Kenyon	Nov. 5, 1910	Public	Wells
Goodhue	Kenyon	Nov. 10, 1911	Public	Wells
Goodhue	Red Wing	Aug. 8, 1910	Public	Wells
Goodhue	Red Wing	Aug. 31, 1910	Public	Wells
Goodhue	Red Wing	Dec. 16, 1910	Public	Wells
Hennepin	Minneapolis	Feb. 20-Mar. 20, 1911	Public	River
Hennepin	Minneapolis	June 6, 1911	Private	Wells
Hennepin	Minneapolis	June 7-14-20, 1911	Public	Wells
Hennepin	Orono	Aug. 12, 1910	Private	Wells
Hennepin	Orono	Aug. 19, 1910	Private	Wells
Hennepin	Tonka Bay	Aug. 19, 1910	Public	Lake
Itasca	Calumet	June 25, 1911	Public	Wells
Itasca	Coleraine	Sept. 21, 1910	Public and private	Wells
Itasca	Coleraine	July 15, 1911	Public	Wells
Itasca	Crookston Lum. Co.	Nov. 8, 1911	Private	Wells
Itasca	Grand Rapids	Jan. 5, 1911	U. S. Gov't Engineer's Headquarters	Wells
Itasca	Keewatin	Sept. 26, 1911	Mine	Mine
Itasca	Marble	Aug. 6-7, 1910	Public	Mine
Itasca	Marble	Aug. 6-7, 1910	Semi-public	Wells
Itasca	Marble	July 16, 1911	Public	Mine
Jackson	Jackson	Aug. 2, 1911	Public	Well
Jackson	Jackson	Aug. 2, 1911	Proposed supply	Spring
Jackson	Jackson	Aug. 2, 1911	Emergency supply	River
Kandiyohi	Willmar	Aug. 25, 1911	Public	Wells
Kandiyohi	Willmar	Aug. 25, 1911	State buildings	Wells
Koochiching	Central	July 24, 1912	Public	River
Koochiching	International Falls	Oct. 25-Nov. 1, 1911	Public	River
Koochiching	International Falls	Nov. 29, 1911	Public	River
Koochiching	Northome	June 13, 1912	Public	Well
Lake	Two Harbors	Feb. 28-Mar. 1, 1912	Public	Lake
Lyon	Tracy	Dec. 19, 1910	Public	Well
Lyon	Tracy	Dec. 19, 1910	Temporary public	Lake
Lyon	Tracy	Sept. 27, 1911	Public	Well
Martin	Fairmont	Jan. 12, 1911	Public	Lake

No. IX

TIGATIONS OF WATER SUPPLIES

Evidence of Pollution Obtained by		Sanitary Condition of Supply Reported as	REMARKS
Field Examination	Analytical Examination		
Present	Present	Unsatisfactory	
Not found	Not found	Satisfactory	
Present	Present	Unsatisfactory	
Present	Present	Unsatisfactory	Hypochlorite treatment recommended
(a)	Present	Satisfactory after treatment	Emergency hypochlorite plant installed.
(a)	Present		Permanent hypocholorite plant installed.
...	...	...	See detailed reports on file.
Not found	Not found	Satisfactory	Two artesian wells.
(c)	Not found	Satisfactory	
(c)	Not found	Satisfactory	
Not found	Not found	Satisfactory	"3rd St. well" in rather an unsanitary condition.
Not found	Not found	Satisfactory	"3rd St. well" still in an unsanitary condition.
Not found	Not found	Satisfactory	
(a)	Not found	Satisfactory	
(b)	Not found	Unsatisfactory	
(b)	Present	Unsatisfactory	
(a)	Present	Unsatisfactory	
(a)	Present	Unsatisfactory	Improved over first examination.
Not found	Not found	Satisfactory	
(c)	Present	Unsatisfactory	Quality of water improved by treatment but not entirely satisfactory.
(a)	Present	Unsatisfactory	Irregular operation of plant.
Present	Present	Unsatisfactory	Irregular operation of plant.
Present	Present	Unsatisfactory	Quality of water improved by treatment but not entirely satisfactory.
Present	Present	Unsatisfactory	Irregular operation of plant.
Present	Present	Unsatisfactory	Irregular operation of plant.
Present	Present	Unsatisfactory	
Not found	Not found	Satisfactory	Mud Lake not satisfactory.
Present	Present	Unsatisfactory	
Not found	Not found	Satisfactory	
(a)	Not found	Satisfactory	
Not found	Not found	Satisfactory	
...	...	...	Chemical examination only.
(a)	Limited	Satisfactory	Recommendation for disinfection.
Not found	Not found	Satisfactory	
...	Not found	Satisfactory	Samples taken from tap in laboratory.
Not found	Not found	Satisfactory	"Visiting Nurse's Camp" supply.
Not found	Not found	Satisfactory	University supply.
Not found	Limited	Suspicious	
Not found	Limited	Improved	
...	...	...	Investigation to determine effect of discharge of laundry waste into lake.
(a)	Present	Unsatisfactory	
(a)	Present	Unsatisfactory	See detailed report on file.
Not found	Limited	Satisfactory	Some contamination due to repairs.
(b)	Present	Unsatisfactory	Samples taken at Camp No. 3.
Present	Present	Unsatisfactory	
Present	Present	Unsatisfactory	
(a)	Not found	Satisfactory	
(a)	Present	Unsatisfactory	See detailed report on file.
(b)	Not found	Satisfactory	
Not found	Not found	Satisfactory	
Not found	Not found	Satisfactory	
Present	Present	Unsatisfactory	
(b)	...	...	See detailed report on file.
(b)	Present	Unsatisfactory	
Present	Present	Unsatisfactory	
(a)	Limited	Unsatisfactory	Installation of permanent hypochlorite plant.
(a)	Not found	Satisfactory	When water is treated.
(b)	Not found	Unsatisfactory	See detailed report on file for private supplies.
Present	Present	Unsatisfactory	Emergency hypochlorite plant successfully treated the supply.
(a)	Not found	Satisfactory	
(a)	Present	Unsatisfactory	
Present	Not found	Unsatisfactory	
(a)	Present	Unsatisfactory	

TABLE No. IX

SHOWING A SUMMARY OF INVESTIGATIONS

COUNTY	Locality	Date of Investigation	Supply	Source
Martin	Fairmont	Jan. 12, 1911	School	Well
Morrison	Little Falls	Nov. 7, 1910	School and public	
Murray	Lake Wilson	Dec. 20, 1910	School and public	Well
Nicollet	North Mankato	Dec. 12, 1910	Private	Well
Norman	Halstad	July 27-28, 1911	Public	Well
Olmsted	Rochester	July 12, 1912	Public and hospital	Well
Ottertail	Fergus Falls	Sept. 30, 1910	Hospital	Well
Ottertail	Fergus Falls	Sept. 30, 1910	Public	River
Polk	Crookston	Jan. 31, 1911	Public	River
Rice	Faribault	Oct. 14, 1910	Public	Wells
Rice	Faribault	Oct. 24, 1911	Public	Wells
Rice	Northfield	Jan. 14, 1911	Public	Wells
Roseau	Roseau	Dec. 20, 1910	Public	Wells
St. Louis	Duluth	Aug. 11-12, 1910	Public	Lake
St. Louis	Duluth	Aug. 25, 1910	Public	Lake
St. Louis	Duluth	Oct. 31, 1911	Steel Co.'s plant	Well
St. Louis	Ely	Nov. 28, 1910	Public	Lake
St. Louis	Ely	June 3, 1911	Mine	Mine
St. Louis	Ely	Feb. 8, 1912	Public	Lake
St. Louis	Gilbert	Feb. 28, 1912	Mine	Mine
St. Louis	Hibbing	Sept. 22, 1910	Public	Mine
St. Louis	Hibbing	Nov. 23, 1910	Mine	Mine
St. Louis	Hibbing	Nov. 23, 1910	Mine	Mine
St. Louis	Mitchell	Nov. 22, 1910	Public	Well
St. Louis	Mountain Iron	June 24, 1911	Public	Well
St. Louis	Mountain Iron	July 15, 1911	Public	
St. Louis	Mountain Iron	July 15, 1911	Mine	Mine
St. Louis	Virginia	June 2, 1911	Public	Wells
St. Louis	Wilpin	July 14, 1911	Private	Lake
Scott	Shakopee	Dec. 5, 1910	Private	Well
Scott	Shakopee	Oct. 11, 1911	Public	Well
Sibley	Henderson	May 24, 1911	Public	Well
Sibley	Henderson	May 24, 1911	Semi-public	Well
Stearns	Melrose	July 17, 1912	Public	River
Stearns	St. Cloud	July 25, 1912	Public	Test well
Stearns	St. Cloud	July 25, 1912	Public	River
Steele	Owatonna	Dec. 5, 1910	Public	Wells
Steele	Owatonna	July 22, 1911	Public	Wells
Stevens	Morris	Sept. 16, 1910	State school	Wells
Wabasha	Lake City	June 22, 1912	Public	Wells
Wabasha	Plainview	Dec. 19, 1911	Public	Wells
Waseca	Janesville	Oct. 19, 1911	Public	Wells
Wilkin	Breckenridge	Sept. 14-15, 1910	Public	River
Wilkin	Breckenridge	May 31-June 1, 1911	Public	River
Winona	Winona	Jan. 29, 1911	Public	Wells
Yellow Medicine	Canby	April 18, 1912	Public	Wells

(a) Field data collected by the Engineering Division of this Board.
(b) Field data collected by the Epidemiological Division of this Board.
(c) Samples collected by trained observers not connected with this Board.

—Continued

OF WATER SUPPLIES—Continued

Evidence of Pollution Obtained by		Sanitary Condition of Supply Reported as	REMARKS
Field Examination	Analytical Examination		
(a)	Not found	Satisfactory	
......	...	......	See report on file.
(a)	Not found	Satisfactory	See report on file.
(c)	Present	Unsatisfactory	
Present	Present	Unsatisfactory	
Not found	Not found	Satisfactory	
Not found	Not found	Satisfactory	
Present	Present	Unsatisfactory	
Not found	Not found	Satisfactory	Hypochlorite plant installed.
Present	Present	Unsatisfactory	
Not found	Not found	Satisfactory	
(a)	Not found	Satisfactory	
(b)	Not found	Satisfactory	See detailed report on file.
Present	Present	Unsatisfactory	
Present	Present	Unsatisfactory	
Not found	Not found	Satisfactory	
(a)	Not found	Satisfactory	
(a)	Not found	Satisfactory	
Present	Present	Unsatisfactory	
Not found	Not found	Satisfactory	
(a)	Not found	Satisfactory	
(a)	Present	Unsatisfactory	
(a)	Not found	Satisfactory	
(a)	Not found	Satisfactory	
(a)	Present	Unsatisfactory	
(a)	Present	Unsatisfactory	
(a)	Not found	Unsatisfactory	
(a)	Not found	Satisfactory	
(a)	Present	Unsatisfactory	
(a)	Present	Unsatisfactory	
...		....	Chemical examination only.
Not found	Not found	Satisfactory	
Present	Present	Unsatisfactory	
Present	Present	Unsatisfactory	
Not found	Not found	Satisfactory	
Present	Present	Unsatisfactory	
(b)	Not found	Satisfactory	
Not found	Not found	Satisfactory	
Not found	Present	Unsatisfactory	
(a)	Not found	Satisfactory	
(a)	Present	Unsatisfactory	
Present	Present	Unsatisfactory	
Present	Present	Unsatisfactory	
Present	Present	Unsatisfactory	
(a)	Not found	Satisfactory	
Present	Present	Unsatisfactory	

The work that has been done in the biennial period on the investigation of water supplies is shown in table IX. The insertion of complete reports on each investigation into this report had been considered but it was found that they took more room than there was space available. For that reason the table was made so as to condense as far as possible and still show the number of localities that have been investigated. The reports on each case are on file in the office of the Board and are available for anyone on application to the Executive Officer.

PURIFICATION OF WATER SUPPLIES.

Of the various scientific methods that have been recommended by different authorities for the purpose of purifying public water supplies, the only ones that have been applied to any extent in Minnesota are:

1. Mechanical filtration.
2. Hypochlorite treatment.
3. A combination of filtration with subsequent hypochlorite treatment.

The principles of mechanical filtration are so well understood that an explanation of that method of water purification is unnecessary. Only two plants of this character are in operation in the state, in which the hypochlorite treatment is not used as an adjunct to the filtration process.

HYPOCHLORITE TREATMENT OF WATER SUPPLIES.

This method for the disinfection of drinking waters is now so thoroughly well known and has been tested so often that any description of the principle upon which it acts is entirely unnecessary.

In Minnesota during the last biennial period it has been used in two ways; firstly as a permanent treatment for any given water supply; secondly, for an emergency treatment of a water supply during the course of an epidemic in which other factors pointed to the water as the carrier of the infection. Too much can not be said for the value of this treatment at such a time. The results which have been obtained in this laboratory show that it is possible to disinfect almost completely, infected water supplies within 48 hours of the time the infection is reported at the laboratory. This is accomplished by means of a portable emergency hypochlorite plant, the design of which has already been described.* Three such plants are kept in constant readiness at the laboratory in order that they may be shipped without delay. During the past biennial period one of these plants have been put into operation in three different localities, namely, Anoka, International Falls and Two Harbors. In each case the plant was installed by the engineering division, but in the case of Two Harbors only did a trained laboratory man accompany the plant to make accurate analytical determinations of the exact amount of hypochloride which was being used. The advantages of having a trained laboratory man on the field of operation at the time of the installation of the plant are very apparent, inasmuch as it is then possible to compute the amount of chemical which will effect the sterilization. In this way it is possible to avoid adding either too much or too little chemical to produce the desired results. An idea of the effectiveness of the treatment can be derived from the results which were thus obtained at Two Harbors.

A typhoid fever epidemic of considerable magnitude was reported at Two Habors on Feb. 27, 1912. The emergency hypochlorite plant was shipped from the laboratory on the evening of the same day and arrived in Two Harbors on the morning of the 28th. Installation was completed on Feb. 29th. There are approximately 100,000 gallons of water used in the city during 24 hours. The water comes from Lake Superior and contains a relatively low organic content. Samples taken at the intake and throughout the distribution system on the day of arrival showed contamination in every sample taken. The chemical was administered in amounts not ex-

*Eng. News, Vol. 65, No. 4, April, 1911, pp. 402-403.

ceeding 0.4 parts per million of available chlorine during the first 24 hours. In order to have a somewhat larger margin of safety, this amount was increased on the second day to 0.5 parts per million. The laboratory results which were subsequently obtained showed that the smaller amounts of chemical produced an almost complete sterilization, giving in each sample taken a count in 1 c.c. amounts which in one case only ran as high as 9; in one case showed 2; in four cases showed 1 and in five cases showed a total absence of bacteria. In no samples were colon bacilli found even in 100 c. c. amounts, after administration of the chemical. With the larger amount of chemical added on the second day, in only one instance were there bacteria of any kind found and in that particular case one colony per c. c.

Excellent as these results are, nevertheless the hypochlorite treatment of water can not be applied in a haphazard manner. It is a well known fact that the chemical varies in the amount of available chlorine which is present. It is necessary to compute accurately the amount of available chlorine in order to apply the proper amount of chemical. Where this is not done, there may be an apparent defect in the treatment, as is shown in what occured at the city of Brainerd; where for various reasons, the proper amount of chemical was not added and it was found that the sterilization was only partially completed. With this in view, it has been determined by the Board that the Laboratory Division should make trips of inspection of the various hypochlorite plants which have been installed, in order to insure their perfect operation.

It should be borne in mind that the amount of chemical necessary to produce sterilization will vary with several factors, among which the organic content appears to play an important part. It is thus found that in waters containing a high organic content, and especially where the organic matter is in suspension, a larger amount of chemical is required than in waters containing a low organic content. For this reason, it is sometimes necessary to filter the water before the application of the chemical is made in order that the suspended, organic material may be removed. Several such plants are in use throughout the state, and it is found that the combination of filtration with hypochlorite (when properly employed) will insure a safe and sanitary water supply.

During the process of the work on testing the efficiency of the hypochlorite treatment, it was found that considerable delay occurred in making the determinations of the results, inasmuch as it was necessary to examine the samples collected in the ordinary way i. e., considerable time was lost in transit to the main laboratory. To overcome this difficulty a portable incubator and a portable outfit for making chemical analysis has been devised, the latter being adapted for testing the chemical phases of the hypochlorite treatment. By possession of an incubator on the spot, it is possible to make a presumptive colon test and a count within 24 hours of the time when the samples are taken. A description of these pieces of apparatus may be found in the American Journal of Public Health, Vol. II. No. 12, pp. 948-955.

SPECIAL INVESTIGATIONS.

Special investigations of water supplies have been made in two instances during the biennial period where complaints have been received by the State Board of Health regarding the discharge of sewage into waters used as a source of drinking supply. In order to obtain exact information concerning the condition of affairs, the laboratory was ordered to investigate each case and supply the Board with reliable data. One such investigation occurred near Marble, the report for which is on file in the office of the Board. The only other one undertaken was a sanitary survey of the Mississippi river from Anoka to Minneapolis with special reference to the water supply for the city of Minneapolis. The report of this investigation is given in full, the analytical results being tabulated in Table XII.

A SANITARY SURVEY OF MISSISSIPPI AND RUM RIVERS RELATIVE TO THE POLLUTION OF THE MINNEAPOLIS WATER SUPPLY BY THE CITY OF ANOKA.

The purpose of this investigation was to determine the effect of the sewage from the Anoka State Asylum and the city of Anoka, discharged into the Rum river at or near Anoka, upon the sanitary quality of the Mississippi river water especially in relation to the pollution of the Minneapolis water supply.

The work of this report embraces a very general description of the Mississippi river basin above Minneapolis and a description of a sanitary survey, both field and analytical, on the Rum river adjacent to Anoka and the Mississippi river and its tributaries between Anoka and Minneapolis.

The exact source of the Mississippi river has been the cause of much controversy but its head waters are generally known to lie within Itasca State Park, a tract of reserved land in Clearwater county. The basin drained by the Mississippi above Minneapolis comprises about 19,500 square miles and has a population of approximately 400,000 people. The principal tributaries of the river above Minneapolis are Leech lake, Prairie, Swan, Willow, Pine, Crow Wing, Platte, Sauk, Crow, Elk and Rum rivers. The principal cities discharging sewage directly into the river or its contributaries are noted below together with the distance of each in miles from Minneapolis.

Into Mississippi river: Bemidji (476), Grand Rapids (336), Aitkin (206), Brainerd (151), Little Falls (114), St. Cloud (76) and Anoka (17).

Into contributaries of Mississippi river: Alexandria (236), into Lake Agnes; Long Prairie (196) into Long Prairie river; Staples (170) into Crow Wing river; Melrose (126) into Sauk River; Hutchison (105) into south fork of Crow river; Milaca (95) and Princeton (80) into the Rum river. Other cities contributing surface drainage into the Mississippi direct are: Sauk Rapids (78), and into its tributaries Park Rapids (210) into Fishhook river; Wadena (186) into Union Creek; Litchfield (105) into Jewitt creek; Milaca (95) into Rum river; Glencoe (85) into Buffalo creek.

The foregoing notes give a general description of the Mississippi river basin above Minneapolis sufficient to bring out the fact that raw sewage is added to this river all along its course and to many of its tributaries. In addition to the urban pollution there are farm houses and other isolated dwellings scattered along the banks which undoubtedly add to the contamination. In order to note all the possible sources of contamination in the area in question, it was necessary to make such sanitary field surveys as were not already covered by the records of this Division. The Mississippi river above Anoka has already been described in a general way sufficient to answer the present needs of this report. The material given here will be confined to a description of the Rum river, the Mississippi river between Anoka and Minneapolis and the tributaries of the Mississippi between these two points. The Rum river rises in Mille Lac lake in Aitkin and Mille Lacs counties and flows south through lakes Ogechie, Nesawae and Onamia. Below this chain of lakes the Rum river flows south, east and south, emptying into the Mississippi at Anoka, seventeen miles above Minneapolis. Its chief tributaries are Bradbury, Tibbetts, Bogus, Whitney, Spencer, Trott brooks and west branch of Rum river. The total drainage area of the river is 1,550 square miles. The three municipalities located on the Rum river are Milaca, Princeton and Anoka. For the remaining distance from its source to mouth it flows mostly through an agricultural country. Milaca is located 78 miles above Anoka. The population of this village is 1,100. A combined sewage system empties into the Rum river below the village. Princeton is located 63 miles above Anoka with a population of 1,555. There is one sanitary sewer 7 or 8 blocks long connected with the public school and about 12 residences and several other private sewers which discharge into the Rum River. The city of Anoka is located near the mouth of the Rum River. The population is about 12,500. The sewage is disposed of largely by means of cesspools. There is one semi-public sewer and a number of private sewers discharging into the Rum River below the dam. Information collected by the Engineering Division shows about 30 connections. A state insane asylum is located on the Rum River just above Anoka. This institution has about 350 inmates. The sewage from this institution is passed through a purification plant and enters the Rum river just above the asylum. The purification is done by septic action followed by filtration. This plant appears at times to give a very good effluent and at other times a very poor one. Trouble has been experienced with the filter beds freezing during the severe winter months. A new purification plant is now being constructed near the railroad bridge below the asylum. The plant will be equipped with an Imhoff tank, filters and apparatus for administering hypochlorite which should give a very satisfactory effluent.

The Mississippi river between its confluence with the Rum river at Anoka and the city of Minneapolis has three tributaries, namely Elm, Coon and Rice. creeks. The Mississippi river on leaving Anoka is a rather turbulent stream largely on account of the boulders and logs deposited in the river bed. At Coon Rapids about 5½ miles below Anoka the water rushes rather violently over deposits of boulders for a number of rods causing well defined rapids. A short distance below, the river broadens out and takes various channels through a collection of islands called Coon Islands. It then narrows again to approximately its former width only to broaden at Dunhams island below Fridley. The remaining distance to the pumping station of the Minneapolis water supply, the river is about uniform in width. There are no municipalities located on the river bank between Anoka and Minneapolis. A number of farm houses are located on the banks and the barnyards of some of these drain into the river. Logging operations are conducted on the river above the city pumping station during open season. On May 25th the log jams extended as far up the river as Fridley. The boom company at that time had several boats moored on the west shore of the river opposite Fridley. A large number of men were working on the log booms and many were housed on the boats just mentioned. A number of men work on the logs near the saw mills opposite the pumping station at Minneapolis.

The first tributary entering the Mississippi river below Anoka is Elm creek. Its confluence with the Mississippi is in the neighborhood of 40 rods below the mouth of the Rum river on the opposite side. Elm creek rises in the northwest corner of Plymouth township in Hennepin county and flows in a northeasterly direction through Rice lake, Hayden lake and the Champlin mill pond near which point it discharges into the Mississippi. The tributaries of this creek are the outlet of Fish lake into Rice lake and Rush creek. The course of the stream is mostly through a low, flat country and the flow is rather sluggish in many places. A few farm dwellings are located along the banks and some surface drainage is received from these sources. The banks are largely agricultural land both tilled and untilled. At Champlin the surface drainage from several houses is in the direction of the mill pond.

Coon creek has its source from springs in the northern part of Anoka county. The upper end being shallow and the flow largely underground it was dredged for a distance of about three miles and the upper end extended by ditching for about two miles. The ditch is named No. 48 ditch. Its beginning is located on the center line through section 12 north and south, one-quarter mile south of the north line of Section 12, Town 32, Range 23. This is about three-quarters of a mile south of Coon lake. Up to the time of this visit ditch No. 48 received only surface water from marshes and meadow land; the purpose of its construction being solely to drain the large tracts on either side in that part of the country north of Coon creek. The ditch was approximately 14 feet wide and 6 feet deep. All information concerning this ditch was obtained from a resident who was largely instrumental in the digging of the ditch and who had the only residence at the upper end, house and outbuildings being about 30 rods away at a slight elevation.

From here the creek flows through five miles of approximately a mile wide strip of wiregrass marsh. None of the six farm houses passed in that distance are located nearer than one-quarter mile from the creek. The land between is flat and marshy. The creek at this point was about five feet in depth and full of vegetable growth. It has always had a flow but never an overflow. One mile and two miles below are farm houses with barnyards directly on the creek bank and with a decided slope toward the creek. All barnyard wash from these places goes directly into the creek. From here the creek passes Andover, a small town. There is but one house and barn at this place located near the creek. From here after making a large loop it reaches Crooked Lake about two miles east of Anoka. There are nine farms adjoining the creek in this distance only one of which has outbuildings within one-quarter mile of the creek. This house and its outbuildings are located directly overlooking the bank with slope toward the creek, thus contributing considerable pollution from the manure-strewn barnyard. For a distance of four miles below Anoka the creek flows through low lands covered with marsh grass, no farms being along the banks nearer than one-quarter mile. Sandy Creek enters at this point bringing drainage water from the country to the east. This creek is also spring fed. Five farm houses are located within a distance of two miles along its course below this point, two of which have barnyard wash going into the creek. Coon Creek at this point is twenty-five feet wide and one to two feet deep; Sandy Creek, five feet wide, three-quarter foot deep. From here the creek banks become quite well defined, the strip of marsh grass on either side being narrower and the growth of trees and shrubbery becoming greater. There was less vegetable growth in the creek bed. These conditions existed until the Northern Pacific railroad crossing at Coon Creek station was reached. More land in this vicinity was cultivated. A farm about one-quarter mile above the railroad had outbuildings, three barns and a chicken coop within one hundred feet of the creek and on ground sloping towards the creek. Passing under the railroad bridge the creek runs within two hundred feet of the brick plant now being operated. A privy used by the employes extends out over the creek and discharges directly into the creek. The stream flows through thick growths of trees and shrubbery to the Mississippi River about a mile away. The banks are well defined and somewhat hilly until the river is reached with no other source of contamination. Cattle grazing is common in the meadow land all along the stream.

Rice Creek rises in the northeast corner of Anoka county and flows in a southwesterly direction through Peltier, George Watch, Marshau, Rice, Baldwin, Golden and Long Lakes finally entering the Mississippi River at Fridley about six miles above Minneapolis. The tributaries of this creek are Centerville, Rashanaw and Stink Lakes. Rice Creek above Long Lake is from ten to fifteen feet wide and its bottom is muddy in most places. Below Long Lake the creek is somewhat wider with a hard bottom covered with boulders. The entire distance from Peltier Lake to the Mississippi was investigated. Centerville and Peltier Lakes have drainage from a number of farm houses and buildings. Stink Lake near New Brighton received the sewage from five rendering plants; this lake discharges into Rice Creek just above Long Lake. A portion of the surface drainage of New Brighton and a wash-water sewer from one saloon enters Long Lake. One farmyard at the outlet of Long Lake drains directly into the creek. At a farm one mile down stream the creek was fenced off and used as part of a hog yard. The entire barnyard at this place drained into the creek. From this point to Fridley no sources of contamination could be found.

The analytical study of this investigation was begun May 25th and was continued until June 25th of this year. On May 25th nine regular sampling stations were located on the Rum and Mississippi Rivers, one substation on each of the three tributaries between Anoka and Minneapolis and a fourth substation at the outlet from the Anoka asylum purificatior plant. Weekly samples have been collected from nearly all the established stations and at irregular intervals from the substations. The following descriptions will serve to locate the various stations and substations.

Station No. 1.—Anoka, Rum River, above state asylum, 100 feet above first bend in river. Samples taken in center of stream in 7 feet of water.

Station No. 2. Anoka, Rum River, below state asylum, at railroad bridge. Sample taken near center of pier in 6 feet of water.

Station No. 3. Anoka, Rum River, 400 feet from mouth of river. Samples taken in center of stream in 4 feet of water.

Station No. 4. Anoka, Mississippi River, road bridge above mouth of Rum River. Samples taken near center pier in 3 feet of water.

Station No. 5. Anoka, Mississippi River, below mouth of Rum River opposite Champlin Flour Mill. Samples collected near center of river in 4 feet of water.

Station No. 6. Coon Rapids, Mississippi River, at the head of Coon Islands just below Coon Rapids. Samples taken in center of stream in 4 feet of water.

Station No. 7.—Coon Rapids, Mississippi River, at the foot of Coon Islands. Sample taken in center of river in 4 feet of water.

Station No. 8.—Fridley, Mississippi River, directly opposite Fridley Station. Sample taken in center of stream in 5 feet of water.

Station No. 9.—Minneapolis, Mississippi River, new pumping station. Sample taken at intake screens in 4 feet of water.

Substation a.—Anoka, outlet to sewage purification plant. Samples taken in small stream leading to river in approximately 1 foot of water.

Substation b.—Champlin, Elm Creek, about 200 feet from mouth. Samples taken in center of stream in 2 feet of water.

Substation c.—Coon Rapids, Coon Creek, about 100 feet from mouth. Samples taken in center of stream in 1 foot of water.

Substation d.—Fridley, Rice Creek, about 100 feet from mouth. Samples taken in center of stream in 2 feet of water.

The analytical results obtained at this investigation, covering a period from May 23, 1912, to June 24, 1912, are to be found in table No. XIII. The table runs consecutively corresponding to the sampling stations. The average condition, rather than any single result is used as the basis upon which the conclusions have been drawn as it gives a fairer index of the quality of the water at the various points. On carefully examining the average physical and chemical results obtained at each of the nine stations, it will be seen that these results over this period of time are practically valueless as to the determination of the sanitary quality at any given point. The bacteriological results bring out certain points very clearly for the period examined. On examining the bacterial counts it is seen that the average number of bacteria per c.c. is not an index of the number of B. coli in the water in these cases. The B. coli results averaged for each station as seen in analytical table No. X. show the least pollution above the asylum (Station 1, B. coli 6.4 c.c.), rapid rise below the asylum (Station 2, B. coli 0.82 c.c.), the same amount below Anoka (Station 3, B. coli 0.82 c.c.), less above Rum River in the Mississippi (Station 4, B. coli in 4.42 c.c.), again more in Mississippi below Rum River (Station 5, B. coli 2.82 c.c.), again less at head of Coon Islands (Station 6, B. coli in 4.22 c.c.). and from this station down the river to the city pumping station a gradual rise in the B. coli content is indicated (Station 9, B. coli 1.0 c.c.)

The bacteriological results on samples taken at the substations show a tendency to corroborate the findings on the river samples. Substation a, the outlet from the asylum purification plant shows a very high count and B. coli in .001 c.c. the smallest amount examined. Substation b, the outlet of Elm Creek shows a relatively high count and B. coli in 33 c.c. amounts (average) a result to be expected from the source and environment of this stream. Likewise Coon Creek, Substation c, shows a high count and the presence of B. coli in 0.1 c.c. amounts. The high count and presence of B. coli in 0.1 c.c. amounts in Rice Creek, Substation d, is also to be expected from the character of the material discharged into its water. These results obtained at the substations verify the results obtained in the river, showing that the asylum sewage is the most marked source of contamination, also that Coon and Rice creeks add an appreciable amount while Elm Creek is the least important in this respect.

SUMMARY AND CONCLUSIONS.

The field results tend to corroborate the analytical results in every instance. The analytical results show the least amount of contamination in the Rum River above the asylum (Station No. 1.) The asylum sewage increases the amount of contamination to a marked extent (Station No. 2), while the sewage discharged at the city of Anoka does not appear to add any appreciable degree of pollution (Station No. 3.) The amount of pollution from the Rum River (Station No. 5) almost doubles the amount of pollution already indicated in the Mississippi above Anoka (Station No. 4.) The amount of natural purification obtained after a flow of about six miles of turbulent water to Coon Islands (Station No. 6) appears to be sufficient to bring the quality of the water back to the degree of pollution which obtains in the Mississippi River above Anoka (Station No. 4.) From the station above Coon Islands the amount of pollution increases as the stations approach the Minneapolis station. This is due to the contamination from Coon and Rice Creeks, the surface drainage from the river banks as the populated areas are approached, but more especially to the logging operations on the river above Minneapolis.

In investigating drinking water supplies the presence of B. coli is accepted as prima facie evidence of contamination, so that bacteriological results are used to determine the presence or absence of pollution. Where pollution is found to exist, field data are employed to determine the source of such pollution. In the present investigation, pollution of the Mississippi River was found to occur from several sources:

(a) Anoka Asylum sewage, contributing marked pollution of undoubted human origin.

(b) City of Anoka—Field data show that sewers with about thirty connections discharge sewage containing human fecal material into Rum River. The amount of pollution of the water, however, as it enters the Mississippi River is not appreciably increased.

(c) Coon Creek—The pollution indicated by analytical results is due in part to the privy discharging into the stream.

(d) Rice Creek—Five rendering plants discharge into the creek, containing both animal and human excrement. Surface wash from the village of New Brighton possibly containing human excrement also finds its way into the creek.

(e) Logging operations—These are carried on most extensively in the territory between Fridley and the pumping station of the Minneapolis water supply. Without a doubt many of the men employed in these operations void their discharges directly into the river. Probably this constitutes the greatest danger as far as the City of Minneapolis is concerned.

(f) Surface Wash—A very limited amount of human pollution distributed over entire extent of the river investigated may be attributed to this source.

INVESTIGATIONS ON THE SANITARY QUALITY OF ICE SUPPLIES.

METHODS OF PROCEDURE.

In a sanitary investigation of an ice supply, the relation which exists between the value of the field data and the analytical data, is much the same as their relation in regard to a water supply. Five investigations on ice supplies have been made during the biennial period, reports of which are found below. The results of these investigations show the absence of dangerous contamination from an analytical point of view in each ice sample examined, although high bacterial counts were found in some samples containing a large amount of suspended material. This would seem to add more proof to the already existing opinion that ice is a small factor in the conveyance of water-borne diseases. In certain cases other supplies were recommended, largely on account of better environment, and from the fact that ice had formed on a water of better sanitary quality. The following localities were investigated:

Atwater: Diamond Lake, Pay Lake, Cottonwood Lake.
Faribault: Soft Water Lake, Cannon River.
Wilpen: Six Mile Lake.

St. Cloud: Lake George, Mississippi River.
Madelia: Laws Lake.

In no case was there any analytical evidence of the presence of contamination in the ice.

INVESTIGATIONS ON CERTIFIELD MILK.

Investigations are undertaken from time to time upon the request of the Medical Milk Commissions in order that they may be supplied with information upon which to issue to dairymen, permission to label their product inspected or certified milk. The requirements for certified milk are included in Regulations 101, 102 and 103. The requirements for inspected milk are the same as those for certified milk, except that the bacterial count may run as high as 100,000 per c.c. It should be understood that the certificates are issued by the Medical Milk Commission concerned and not by the State Board of Health, although the laboratory of the State Board of Health supplies the information on which the milk certificates are issued. During the biennial period only one dairy has been recommended for investigation at the main laboratory, namely, that owned by J. M. Hackney near Lake Josephine, and called the Arden Dairy. Permits for selling certified milk are issued to this dairy by the Ramsey County Milk Commission. Investigations of this dairy have been in progress since the 24th of February, 1911. Samples selected by a representative of the laboratory are obtained from the drivers of the wagons at irregular intervals, being procured usually once each week. From time to time where high counts were obtained, trips of inspection to the dairy were made and suggestions given for remedying certain difficulties which apparently allowed contamination of the milk. The results obtained from this particular dairy are found in the appended table:

Lab. No.	Date Collected	Bacteria per cc.	Lab. No.	Bacteria Collected	Date per cc.	Lab. No.	Date Collected	Bacteria per cc.
1	2-24-11	150,000	41	5-18-11	1,700	81	11-15-11	950
2	2-24-11	150,000	42	5-18-11	3,500	82	11-23-11	2,000
3	2-28-11	2,900	43	5-18-11	450	83	11-29-11	1,400
4	2-28-11	2,300	44	5-18-11	3,000	84	12- 6-11	850
5	3- 2-11	31,000	45	5-18-11	3,900	85	12-12-11	1,800
6	3- 2-11	22,000	46	5-18-11	2,000	86	12-21-11	550
7	3- 7-11	18,000	47	5-23-11	7,600	87	1- 2-12	300
8	3-13-11	1,500	48	5-25-11	71,000	88	1-12-12	800
9	3-14-11	50,000	49	6- 6-11	13,500	89	1-19-12	1,000
10	3-16-11	70,000	50	6- 9-11	17,000	90	1-26-12	3,500
11	3-21-11	52,000	51	6-14-11	200,000	91	1-31-12	6,600
12	3-24-11	6,000	52	6-16-11	15,000	92	2- 7-12	2,100
13	3-28-11	4,200	53	6-20-11	6,100	93	2-14-12	3,000
14	3-30-11	5,000	54	6-23-11	30,500	94	2-23-12	36,000
15	4- 4-11	4,000	55	6-27-11	12,000	95	3- 1-12	2,200
16	4-11-11	1,300	56	6-30-11	78,000	96	3- 5-12	1,300
17	4-11-11	5,800	57	7- 7-11	11,000	97	3-13-12	5,000
18	4-13-11	34,500	58	7-11-11	23,000	98	3-21-12	1,300
19	4-19-11	50,000	59	7-13-11	24,000	99	3-28-12	2,000
20	4-21-11	90,000	60	7-19-11	8,100	100	4- 2-12	2,600
21	4-25-11	300,000	61	7-25-11	37,000	101	4-10-12	3,200
22	4-27-11	20,000	62	7-28-11	32,000	102	4-17-12	7,900
23	4-28-11	13,000	63	8- 2-11	9,300	103	4-24-12	9,000
24	4-28-11	330,000	64	8- 4-11	59,000	104	5- 1-12	150,000
25	4-28-11	330,000	65	8- 8-11	120,000	105	5- 8-12	11,000
26	4-28-11	120	66	8-11-11	52,000	106	5-15-12	5,200
27	4-28-11	51,000	67	8-17-11	contam't'd.	107	5-22-12	5,900
28	4-28-11	800	68	8-22-11	25,500	108	5-22-12	6,300
29	4-28-11	3,000	69	8-25-11	5,300	109	5-31-12	1,000
30	4-28-11	26,000	70	8-29-11	7,400	110	6- 5-12	1,100
31	5- 2-11	90,000	71	9- 5-11	75,000	111	6-13-12	37,000
32	5- 4-11	200	72	9-14-11	contam't'd.	112	6-20-12	3,900
33	5- 4-11	5,100	73	9-22-11	58,400	113	6-26-12	3,300
34	5- 4-11	950	74	9-26-11	1,800,000	114	7- 5-12	7,000
35	5- 4-11	3,000	75	10-10-11	30,000	115	7-10-12	6,600
36	5- 4-11	3,000	76	10-12-11	48,500	116	7-17-12	8,300
37	5- 9-11	2,650	77	10-18-11	95,000	117	7-26-12	4,800
38	5-11-11	3,000	78	10-25-11	1,500	118	7-31-12	3,900
39	5-16-11	2,700	79	11- 1-11	45,000			
40	5-18-11	8,000	80	11- 8-11	1,100			

INVESTIGATIONS ON SEWAGE PROBLEMS.

The function of the laboratory in this regard is to test, from time to time, the efficiency of sewage purification plants throughout the state. The laboratory is equipped with necessary apparatus to make such investigations as requirements demand. There have, however, been no cases during this biennial period in which such investigations seemed necessary or desirable. From time to time it is necessary to investigate general sewage problems where they have any relation to a drinking water supply. This is also a function of the Laboratory Division.

INVESTIGATIONS ON EMBALMING FLUIDS.

From time to time investigations on embalming fluids are undertaken to determine for the executive officer of the Board whether the embalming fluids which have been put on the market in the state comply with Regulations No. 158 and No. 159 of this Board. During the biennial period embalming fluids have been examined from time to time, as shown in the table which is appended:

TABLE X—EXAMINATIONS OF EMBALMING FLUIDS

Date	Brand	Name and Address of Manufacturer	Form	Quantity in Container	Dilution Prescribed	% Formaldehyde wgt. per Volume	% Resulting from Dilution
4-17-11	Red Falcon	Max Huncke Chem. Co., Brooklyn, N. Y., St. Louis, Mo.	Conc.	445 cc	Make to ½ gallon.	19.80%	1.76%
4-17-11	Esco Raco	Embalmers Supply Co., Westport, Conn.	Conc.	485 cc	Make to ½ gallon	29.25%	7.50%
4-17-11	Multum	Durfee Embalming Fluid Co., Grand Rapids, Mich.	Conc.	130 cc	Make to ½ gallon.	34.26%	7.81%
4-17-11	Cosmet	Clark Fluid Co., Cincinnati, O.	Conc.	500 cc	Make to ½ gallon	15.36%	4.06%
4-17-11	Ozonet	Ozonet Chemical Co., Minneapolis, Minn.	Conc.	135 cc	Make to ½ gallon	21.69%	4.98%
4-17-11	Best Con	Embalmers Supply Co., Westport, Conn.	Conc.	165 cc	Make to ½ gallon	29.30%	7.21%
4-17-11	Cairo	U. S. Chemical Co., New York, Chicago	Conc.	340 cc	Add 51 oz. water.	27.33%	4.80%
4-17-11	Champion	Champion Chemical Co., Springfield, O.	Conc.	160 cc	*	18.42%	
4-17-11	Clark's	Clark Fluid Co., Cincinnati, O.	Dilute	1800 cc		3.55%	3.55%
4-17-11	Frigid	Frigid Fluid Co., Chicago, Ill.	Conc.	415 cc	Make to ½ gallon	31.65%	6.91%
4-17-11	Dioxin	H. S. Eckels & Co., Philadelphia, Pa.	Conc.	475 cc	Make to ½ gallon	22.32%	5.60%
4-17-11	"Private"	Amor & Co., Minneapolis, Minn.	Dilute			2.76%	2.76%
4-18-12	Monarch	H. S. Eckels & Co., Philadelphia, Pa.	Conc.	465 cc	Make to ½ gallon.	17.52%	4.30%
4-18-12	Alcoform	Egyptian Chemical Co., Boston, Mass.	Conc.	255 cc	Add 3½ pt. water	35.70%	4.76%
4-18-12	Li Flike	Imperial Fluid Co., Syracuse, N. Y.	Conc.	240 cc	Add 56 oz. water.	25.67%	3.25%
4-18-12	Naturelle	De Pree Chemical Co., Holland, Mich.	Conc.	250 cc	Make to ½ gallon.	43.86%	5.79%
4-18-12	Ozonet (new)	Ozonet Chemical Co., Minneapolis, Minn.	Conc.	470 cc	Make to ½ gallon	21.63%	5.37%
4-18-12	Ozonet (Special)	Ozonet Chemical Co., Minneapolis, Minn.	Conc.	480 cc	Make to ¼ gallon	22.71%	5.76%
4-18-12	Perfectum	Durfee Embalming Fluid Co., Grand Rapids, Mich.	Conc.	410 cc	Make to ½ gallon	35.28%	7.64%
4-21-12	Bisga	U. S. Chemical Co., New York, Chicago	Dilute	1810 cc		4.69%	4.69%
9-5-11	Gopher	J. L. Koll, Minneapolis, Minn.	Conc.	480 cc	Make to ½ gallon	23.90%	6.06%

*No dilution prescribed on bottle

PASTEUR DEPARTMENT.

The work in this department consists of:

1. Diagnosis of rabies.
2. Preparation of antirabic vaccine for the Pasteur preventive treatment.
3. Administration of the Pasteur treatment.
4. Consultation and advice as to the giving or withholding of the antirabic treatment.

Since the prevalence of rabies is not fully appreciated it has been thought best to review briefly the history of rabies in this state as far as the records of the State Board of Health permit. Some of the most important facts concerning rabies are also given in the hope that they may prove useful as a ready reference. No attempt is here made to give a complete setting forth of rabies in any of its phases. Most of the statements given may be found in almost any treatise upon this disease.

The diagnosis of rabies was formerly a part of the work of the diagnostic laboratory but because of its close relationship to the Pasteur cases it has been done by this department since its establishment.

The preparation and administration of the antirabic vaccine is described in detail under the heading Pasteur Institute.

The numbers of consultations are numerous and consume much time. The general advice given is covered in the discussion of rabies and is briefly summarized under "Indications for Treatment."

RABIES.

Historical—In 1897 the first twenty cases* of suspected rabies examined in these laboratories were reported. With but one exception the suspected specimens were from dogs. In this one case, that of a human being, no diagnosis was made, likewise in two specimens from dogs it was impossible to make a diagnosis. In one specimen, rabies was excluded while rabies was positively diagnosed in sixteen cases. The sixteen positive cases came from seven localities as follows: St. Paul, 7; Minneapolis, 2; Maryville, 2; Mora, 2; Benson, 1; New Auburn, 1, and New Market 1. It is thus seen that at this time there were three infected localities besides St. Paul and Minneapolis in the eastern half of the state not far from these cities. At the same time there was one infected locality as far west as Benson, Swift county, and as far north as Mora, Kanabec county. A second report† which included all examinations to June, 1900, added twenty-six suspected cases, fifteen of which were proven to be rabies. A map showing the geographical distribution of the positive and suspected cases was presented in this report. It is reproduced on the following page.

From June 1, 1900, to August 1, 1910, 404 investigations were made. Below is given a summary of the positive cases, 228, indicating the extent of rabies infection within this state as shown by these examinations.

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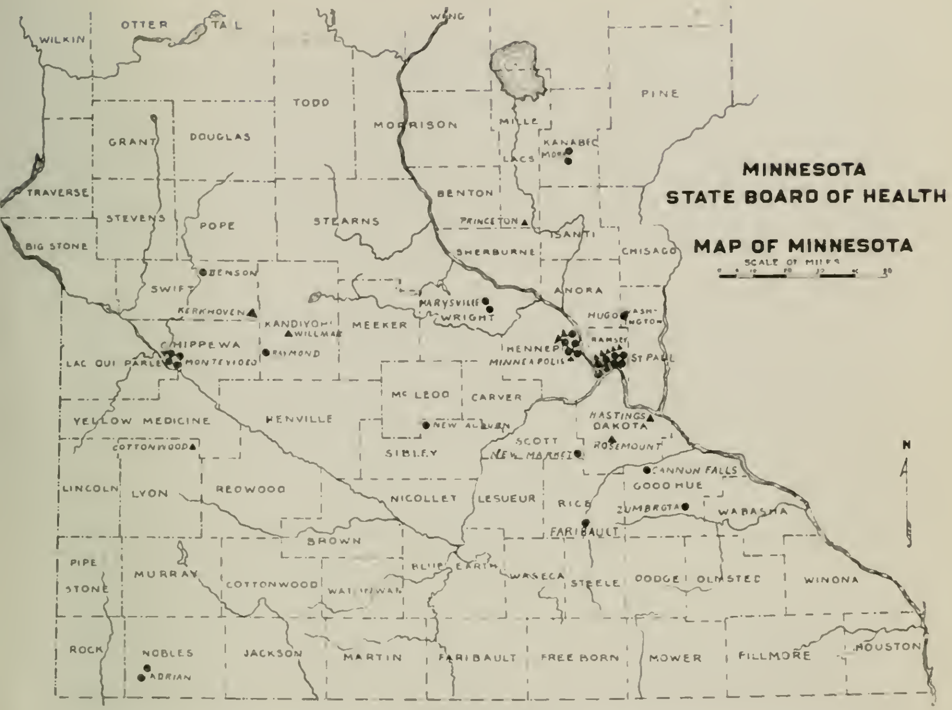
*Preliminary report on the laboratory diagnosis in twenty cases of suspected rabies. F. F. Wesbrook and Louis B. Wilson, Transactions of the American Public Health Association, 1898.

†Rabies in Minnesota. F. F. Wesbrook, M. D., St. Paul Med. Journal, October, 1900.



MAP No. 2

●Cases which from specimens received were diagnosed rabies in laboratory.
▲Cases in which from specimens received rabies could not be diagnosed in laboratory, though in a few it was excluded.

*SUMMARY OF RABIES CASES IN WHICH A LABORATORY DIAGNOSIS WAS MADE FROM JUNE 1, 1900, TO AUGUST 1, 1910.

Year.	Rabies Cases.	Infected Localities.	Infected Counties.
1900 (last 7 months)	5	5	5
1901	†14	11	9
1902	9	9	8
1903	8	8	8
1904	6	5	4
1905	‡8	5	4
1906	**26	23	15
1907	§65	41	25
1908	•38	27	20
1909	†37	22	16
1910 (first 7 months)	12	9	8

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*See also map No. 5, page 363, of this report.
†One human case included.
‡One human case included, one case from South Dakota.
**One case from North Dakota.
§One human case included, one case from Wisconsin.
•Two human cases included, one case from Wisconsin.

From map No. 2, it will be seen that as early as 1900 many of the rabies cases diagnosed in these laboratories were from St. Paul and Minneapolis. Just about this time, however, the previously established municipal laboratories in these two cities began to make all rabies diagnoses in suspected cases arising within their respective cities instead of sending specimens from such cases to the State Board of Health Laboratories either for a diagnosis alone or in order to have their own investigations checked by another laboratory. It should be remembered also that laboratory examinations of material from animals suspected of having rabies were made during this period by the State Agricultural College and by the State Live Stock Sanitary Board, following its establishment in 1903. The records* of the above mentioned laboratories would aad to our record many cases of rabies and would doubtless show a greater number of infected localities within this state. In interpreting the above summary it must be remembered that these positive cases give no suggestion as to the number of domestic animals that have succumbed to rabies in each locality where one or but two or three positive cases have been investigated. The summary shows that six human beings died of rabies in Minnesota in a period of less than ten years. It is probable, however, that several other fatalities in which there was no laboratory investigation were due to rabies infection.

Cause and Transmission—The cause of rabies is an infectious agent usually spoken of as the virus of rabies the exact nature of which is not definitely known. The virus of rabies is present in the saliva, in the central nervous system, in the peripheral nerves, in numerous glands including the salivary and lacteal and elsewhere in the body of the rabid animal. The virus of rabies has been shown to be present in the saliva of the dog a few days (four to six) before the first symptoms of rabies are observed. Rabies is practically always transmitted from animal to animal and from animal to man through biting, but if the saliva of the rabid animal is brought in contact with an open wound of whatever origin, infection may take place. It is not known how early the virus appears in the milk of rabid animals and its constancy in the milk may be questioned, but in one instance in a sample of milk from a rabid cow examined in this laboratory in 1900 and previously reported** the virus was found present. However there is probably no danger in partaking of virus-bearing milk since the digestive juices rapidly attenuate or weaken the rabic virus. The ingestion of even the brain of a rabid animal does not as a rule give rise to rabies in susceptible animals, (some experiments in rodents to the contrary). Should there be wounds of the mucous membrane of the mouth or oesophagus, infection may take place. It is likely that dogs, wolves, rats, etc., fighting over the carcass of a rabid animal may become infected through open wounds.

Susceptibility—Not only is the whole dog family susceptible to rabies, but cats, the other domestic animals, and, in fact all warm blooded animals including man are susceptible. However, all animals bitten by rabid animals do not develop rabies; in dogs, about one out of every two or three succumbs, in man one out of every five or six. This immunity is due in part to the fact that the teeth of the rabid animal are more or less freed from the saliva in their passage through the hair in animals and clothing in man. Fewer cases occur in women than in men partly because of greater protection by the clothing and partly because of habit and occupation they are less exposed to rabid animals.

Dogs that remain at home and receive more careful supervision than dogs that run at large, are less exposed to other rabid dogs. This probably affords the basis for the belief that pet dogs, young dogs, etc., do not have rabies. So far as is known, all breeds of dogs are equally susceptible, while it is likely that young animals generally are more susceptible than mature animals of the same species.

Incubation Period—The period of incubation in both man and animals is exceedingly variable. In man the disease very rarely develops in less than three weeks, the usual period being from five to nine weeks. Rarely the disease develops as late as six or seven months and very rarely it has been reported as occurring later. One case reported[*] in 1900 by Dr. Sweeney, St. Paul, developed after a period of about eleven months.

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*See page 362 of this report.

**Trans. Am. Pub. Health Assn., 1900, p. 286.

In dogs the incubation period is on the whole shorter; the usual period is two to five weeks, rarely earlier than two weeks and occasionally the incubation period may be prolonged to six months or longer. In a dog[†] owned by Mr. B. of Stewart, Minn., who was one of the first patients to receive the preventive treatment at the Minnesota State Board of Health Pasteur Department, rabies developed between six and seven months after infection. Both Mr. B.'s dog and the dog that bit his dog were pronounced rabid from laboratory examination by the laboratory of the State Live Stock Sanitary Board.

Seasonal Influence—Rabies prevails throughout the year and at all latitudes. Its incidence is markedly influenced by the restriction or nonrestriction of dogs. It is commonly noted that there are fewer cases of rabies reported in the last quarter of the year. This lessened incidence is very probably brought about by the more or less imperfect enforcement of restrictions of dogs during the summer months which is commonly carried out owing to the very general but erroneous belief in an old superstition that "dog days" in some way influence the occurrence of rabies in dogs. Without restrictions it appears that well dogs are more active in biting persons during hot weather than at other seasons of the year. This manifestation of irritability may be due in not rabid dogs to excessive heat and to excessive play and teasing thrust upon them by aggregations of children not otherwise engaged throughout the summer months.

The virus of rabies, e. g., as contained in the brain or cord of a rabid animal, if exposed to air at the ordinary room temperature, not to mention excessive summer heat, rapidly deteriorates and in a few days becomes inert, i. e., incapable of giving rise to the disease when inoculated into susceptible animals. On the other hand, if the brain or cord of a rabid animal be kept below the freezing point, the virus will retain its virulence indefinitely.

Diagnosis Suggestions[**]—Any sudden change in the habits or disposition of a dog should place the dog under suspicion. Such changes as a quiet dog becoming restless or even too playful, an active dog becoming dull or skulking into a corner or under porches, furniture, etc., as though to avoid being disturbed, an indifferent dog becoming affectionate, an affectionate dog cross, etc., should cause one to suspect the possibility of rabies. One should be very circumspect about trying to remove a "bone" from a dog's throat or in ministering to his needs in case poisoning is suspected. In fact if rabies is known to exist in a community any signs of illness in a dog should cause the person who makes such observations to take measures at once to prevent the biting of persons or animals.

[‡]**Treatment of Wounds Inflicted by Rabid Dog**—Promote bleeding from the wound by the usual methods and cauterize at the earliest moment. Fuming nitric acid has been shown experimentally to possess a high degree of efficiency and its use even as late as four days following the biting has been advised by one authority. Of household remedies, probably turpentine is the most effective.

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[*] St. Paul Med. Journal, 1900, Vol. II.

[**] See page 354, Diagnosis in the Living Dog.

[†] It is interesting to note that Mr. B., who knew that his dog had been bitten by a rabid dog, had kept his dog under close observation during this period of incubation. The dog had been chained during the day time and had been shut up at night.

[‡] See page 368, Indications for the Pasteur Treatment.

Diagnosis in the Living Dog—This is the method of preference, for the reason that if rabies does not exist it can be excluded promptly and certainly in practically all cases. This diagnosis should be checked by laboratory examination in all cases where the dog dies or is killed within the below mentioned time limit of two weeks.

Method:
1. Secure the dog alive if it can be **safely** done.
2. Keep him under observation two weeks giving him good care.
3. If dog remains well throughout two weeks period, rabies is excluded.
4. Should dog become sick, consider probability and possibility of rabies, seek competent advice.
5. Should dog die, be killed, or disappear from home, act upon presumption that dog had rabies.
6. Upon death of dog whether through killing or from sickness send his head to laboratory for examination.

Note—Rabies virus may be present in a dog's mouth five or six days before symptoms arise. It is possible therefore for a dog apparently well at the time of biting to communicate rabies. The brain of a dog killed during this stage of infection would generally yield negative microscopic findings. If a dog that bites a person is at the same time violent and danger would be incurred in attempting to secure him, he should be shot, through the heart, if possible, rather than through the head, since in the latter case the damage to the brain may interfere with making a satisfactory laboratory examination.

The symptoms of rabies in the dog are quite variable. Among those most commonly observed are, early irritability and restlessness which may or may not be associated with snappishness or with over playfulness, or dullness, shyness, loss of appetitie and no tendency to snappishness. Appetite may also be good or ravenous and such things as wood, door mats, shoes, clothing, straw, leaves, sand, etc., may be chewed by the dog and portions of these and other foreign materials are often found in the stomach of a rabid dog. A "bone in the throat" is often suspected. This symptom is due to earlv paralysis of muscles of jaw and consequent inability to swallow. Drooling may be marked and if the respired air bubbles through the saliva sufficiently there may be "forthing at the mouth." Violence in the course of the sickness may or may not be present. There may or may not be convulsions. Gradually increasing weakness, sometimes developing rapidly and being most noticeable in hind quarters, ending in paralysis and death, is commonly a marked symptom. The temporary disappearance from home for a few days just prior to strange actions or an appearance of illness in the dog is often a symptom. The permanent disappearance of a dog in whom symptoms have or have not been observed should be interpreted as a symptom of rabies if it is necessary to decide upon the giving or withholding of the preventive treatment in case a person has been bitten.

Rabies is usually fatal in the dog in from three to five days after first symptoms are observed. It is almost invariably fatal inside of eight days from onset of symptoms. A few cases of recovery in dogs are mentioned in the literature. For this reason we advise great caution in excluding a diagnosis of rabies in a sick dog that has bitten a person even though the symptoms are atypical of rabies and recovery takes place. Under "Laboratory Diagnosis of Rabies" it is explained that negative microscopic findings in the suspected dog's brain do not exclude rabies and that a negative laboratory diagnosis cannot usually be given under a period of several months. It is on account of these facts that we urge that observation of the living dog be practiced when it can be done safely in order that rabies be excluded most promptly and thereby much anxiety and the necessity for treatment be avoided by any bitten individuals. A clinical diagnosis of rabies may be questioned, a positive laboratory diagnosis is final. In order that an unquestioned diagnosis of rabies may be established when present, it is urged that the heads of suspected dogs be forwarded for a laboratory examination at least whenever it becomes necessary to treat a person infected or possibly infected by such a dog.

Laboratory Diagnosis of Rabies—The laboratory diagnosis is made through the examination of the brain of the suspected animal. It is important that the brain be in good condition when received in the laboratory, otherwise only unsatisfactory results of examinations are to be expected.

Two methods are used, one microscopical and one biological. The microscopical method consists in a search for the presence of microscopic bodies, called Negri bodies after Negri, an Italian who first described them in 1903. These bodies are usually most numerous and most readily found in the hippocampus major and the cerebellum. Negri bodies are not demonstrable in all cases of rabies. They are commonly not found in an animal that has been killed early in the course of the disease. The failure to find Negri bodies is also frequently due to the specimen being in an advanced state of decomposition when received. While Negri and others consider these bodies to be protozoa and the cause of rabies, this relation to rabies cannot be accepted as proven.

The biological method depends upon the development or non-development of rabies in laboratory animals inoculated intra-cranially with a small piece of the central nervous system of the suspected animal. Formerly the biological method alone was used. In 1905 the microscopic search for Negri bodies was adopted as a routine procedure. In a series* of 175 specimens received in this laboratory from April 25, 1905 to August 1, 1908, both methods were used. From this work it was concluded that the biological method may be omitted when undoubted Negri bodies are demonstrable. At the present time the biological method is used only when Negri bodies are not demonstrated.

Method of Removing Brain from the Skull—After dissecting off the skin and muscles over cranium and upper vertebrae, care being taken not to cut through the ligamentous covering to the occipito-atlantoid space, the region of this space is seared by means of a hot iron. Incision through the space into the spinal canal is then made. A scalpel or a Volkman's spoon is directed upward and a portion of the medulla is removed, placed in neutral glycerine and preserved for animal inoculations. The skull is then opened by means of saw and chisel and brain removed. Cultures are made from medulla and from the meninges and direct smear preparations are stained to detect presence of bacteria. If material is contaminated the inoculation material receives one or more changes of glycerine at intervals of about four days before it is used to inoculate laboratory animals. In case the head was severed from the body of the dog or other animal so close to the occiput that the medulla is certainly contaminated, after lifting the skull cap a portion of the cerebrum or cerebellum is removed in a sterile manner and preserved in glycerine for later inoculation of animals if necessary.

Microscopical Method—Direct smears from the ammonshorn and cerebellum are made and fixed in methyl alcohol or in Zenker's fluid. These smears are stained usually by the method adopted by the Laboratory Section of the American Public Health association or by that of D. L. Harris.

These smears are then searched for the presence of Negri bodies. By means of the stained direct smears it is frequently possible to demonstrate Negri bodies within a few minutes after the removal of the brain from the skull. If Negri bodies are not found in the smears, portions of the ammonshorn and cerebellum hardened in Zenker's or other fixing fluid are sectioned in paraffin, stained and examined. This process usually requires several days. Sections are usually stained by Manns' or Frothinghams' method or by the methylene-blue-eosin method of Mallory. If Negri bodies are found in smears or sections a diagnosis of rabies is given. If Negri bodies are not found the biological method is resorted to.

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*Diagnosis and the Pasteur Treatment, O. McDaniel. Northwestern Lancet, February, 1910.

Biological Method—Two rabbits are intracerebrally inoculated with an emulsion of the medulla or other part of the brain of the suspected animal. The details of the method of inoculating the rabbit are the same as are given on page 366. Upon the death of these rabies following characteristic symptoms of rabies a diagnosis of rabies is given. Death in the rabbit following symptoms of rabies usually occurs in from 16 to 21 days after the inoculation. Rarely the incubation period is considerably prolonged so that a negative diagnosis cannot be given, i. e., rabies cannot be excluded through the non-development of rabies symptoms in the rabbit under a period of a number of months.

Preparation of Specimens and Directions for Shipment to the Laboratory—

Caution—Gloves should be used in handling the carcass of an animal suspected of having rabies. In this way all possibility of infection through slight skin wounds so small as to be unnoticed will be avoided.

1. Immediately upon the death of the dog cut the head off close to the shoulders leaving the neck attached to the head, and wrap in ordinary muslin.

Note to 1. If the brain is shot into or the skull is crushed, it is well to forward the spinal cord or a portion of it along with the damaged head. To remove the spinal cord cut through skin, muscles, ribs, etc., on either side of spinal column, removing all or a portion of the spinal column, leaving the cord inside the vertebrae. If it is desired to ship the head of a horse, cow, hog or other large animal, the lower jaw may be unjointed and the soft tissues of the neck cut off. The nose may be sawed off just in front of the eyes. If the head of a large animal is thus trimmed down without opening the skull, chilling and freezing take place more rapidly and better preservation is insured. There is also a gain in convenience in packing as well as in lowered expressage.

2. Chill or freeze head at once and keep cold, frozen if possible, until time to repack for shipment. Chilling may be accomplished by packing the wrapped head thoroughly in cracked ice. Freezing may be accomplished by packing in cracked ice and rock salt, layer by layer. In winter the head may be frozen out of doors.

Note to 2. A day's time consumed in properly preparing a specimen for shipment will often save weeks or even months in obtaining a diagnosis, and in certain cases will render a laboratory diagnosis possible, when if the head is improperly shipped no diagnosis can be made. Hasty shipment often results in the head being in an advanced stage of decomposition when it reaches the laboratory. This is especially true in hot weather and in case the skull has been shot into or crushed. The immediate microscopic examination of such heads is usually unsatisfactory. At best a diagnosis can perhaps be made through animal inoculations only after a number of months' delay.

3. Just before shipment the head already wrapped in muslin should be repacked in ice and sawdust using sufficient ice to keep it cool during shipment. A good container is a small keg; for small heads and short hauls, where but little ice is needed, a candy pail is a satisfactory container.

4. Tag or label the container with the address given below and give name and address of the consignor. Ship by express.

From............................

....

Dr. R. H. Mullin,
Director, Laboratory Division, State Board of Health,
University Campus,
Minneapolis, Minn.

RUSH.

Perishable. Keep cool.

To express agent in Minneapolis: Advise consignee immediately by telephone (E. 2760) of the receipt of this package.

5. Forward a letter on first mail to the above address, giving the fullest possible information.

The following data* are desired:

Name, residence and P. O. address of owner of dog (or other animal).

An account of illness of dog, noting any strange actions on the part of the dog, his wanderings, etc.

Date of earliest symptoms and of death of dog.

If dog was killed, reason for killing, how and when killed.

Names, residences and postoffice addresses of bitten persons together with dates of biting.

Names, residences and postoffice addresses of owners of dogs or other domestic animals bitten by the suspected dog together with dates of biting.

If there is a history that the suspected animal was bitten by a known or supposedly rabid dog, give details as to first dog (name, residence, etc., of owner) stating when and under what circumstances such biting took place.

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*Data blanks are provided on request.

RABIES EXAMINATIONS.

During the biennial period ending July 31, 1912, the heads or portions of the central nervous systems of 124 animals—ninety-eight dogs, ten cats, nine bovines, four horses and three hogs were received for examination. One hundred thirteen specimens were forwarded from sixty-one localities in Minnesota, eight specimens from six localities in South Dakota, and three from two localities in North Dakota.

Rabies was diagnosed in twenty-five of forty-two specimens received during the year ending July 31, 1911, eighteen positive cases being from eleven localities in Minnesota as shown in the accompany map, No. 3, and seven from five localities outside of the state.

LIST OF LOCALITIES GIVING NUMBER OF POSITIVE RABIES CASES FOR THE YEAR ENDING JULY 31, 1911.

(Numbers 1-11 correspond to numbers on map.)

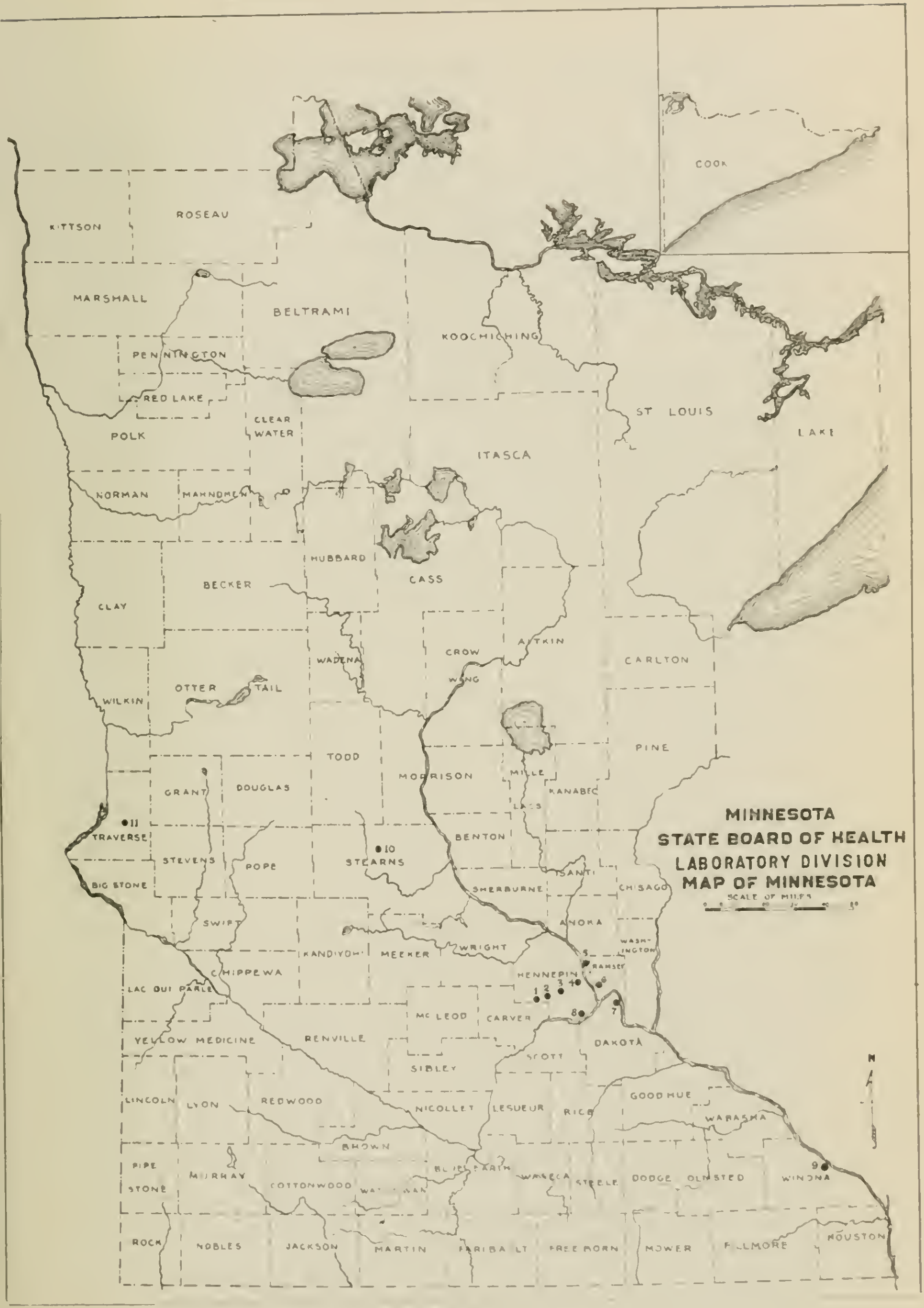
1.	Excelsior, Hennepin county	1
2.	Deephaven, Hennepin county	3
3.	Hopkins, Hennepin county	2
4.	Minneapolis, Hennepin county	4
5.	Fridley, Anoka county	2
6.	Rose township, Ramsey county	1
7.	South St. Paul, Dakota county	1
8.	Bloomington, Hennepin county	1
9.	Winona, Winona county	1
10.	Freeport, Stearns county	1
11.	Dumont, Traverse county	1
	Ellendale, North Dakota	2
	Effington, South Dakota	1
	Ft. Pierre, South Dakota	1
	Newark, South Dakota	1
	Pierre, South Dakota	2

Rabies was diagnosed in fifty-five of eighty-two specimens received during the year ending July 31, 1912, fifty-four positive cases being from thirty-three localities in Minnesota, as shown in the accompanying map, No. 4, and one from North Dakota.

LIST OF LOCALITIES GIVING NUMBER OF POSITIVE RABIES CASES FOR THE YEAR ENDING JULY 31, 1912.

(Numbers 1-33 correspond to numbers on map.)

1.	Fridley, Anoka county	2
2.	Anoka, Anoka county	2
3.	Minneapolis, Hennepin county	7
4.	Plymouth township, Hennepin county	1
5.	Hopkins, Hennepin county	3
6.	Excelsior, Hennepin county	1
7.	Bloomington, Hennepin county	4
8.	Ft. Snelling	1
9.	St. Paul, Ramsey county	1
10.	Rose township, Ramsey county	1
11.	North St. Paul, Ramsey county	1
12.	Lake Elmo, Washington county	1
13.	Grant township, Washington county	1
14.	Withrow, Washington county	1
15.	Marine Mills, Washington county	1
16.	Forest Lake, Washington county	1
17.	Inver Grove township, Dakota county	2
18.	Waverly, Wright county	2
19.	Winona, Winona county	1
20.	Granger, Fillmore county	2
21.	Winnebago township, Houston county	1
22.	Perham, Otter Tail county	1
23.	Ulen, Clay county	1
24.	Mahnomen, Mahnomen county	1
25.	Waubun, Mahnomen county	1
26.	White Earth Indian Reservation, Mahnomen county	1
27.	Callaway, Becker county	1
28.	Wright, Carlton county	1
29.	Iron Junction, St. Louis county	1
30.	Eveleth, St. Louis county	1
31.	Aurora, St. Louis county	1
32.	McKinley, St. Louis county	1
33.	Virginia, St. Louis county	6
	Enderlin, North Dakota	1



MAP No. 3

INFECTED LOCALITIES DURING YEAR ENDING JULY 31, 1911.

TABLE A.—GIVING AN ANALYSIS OF EXAMINATIONS.

		Positive	Negative	Unsatisfactory
1	Negri bodies +	63		
2	Negri bodies —, animal inoc. +	12		
3	Negri bodies?, animal inoc. +	1		
4	Negri bodies not looked for, animal inoc. +	4		
5	Negri bodies —, animal inoc. —		35	
6	Negri bodies not looked for, animal inoc. —		5	
7	Negri bodies —, animal inoc. unsatisfactory			3
8	No examination			1
	Total	80	40	4

Notes to Table A.: Under 2, in five cases the material was noted as soft and in four cases as very soft. In the remaining three cases the brain was in good condition.

Under 4, in these four cases the brain was in such bad condition that neither ammonshorn nor cerebellum could be identified.

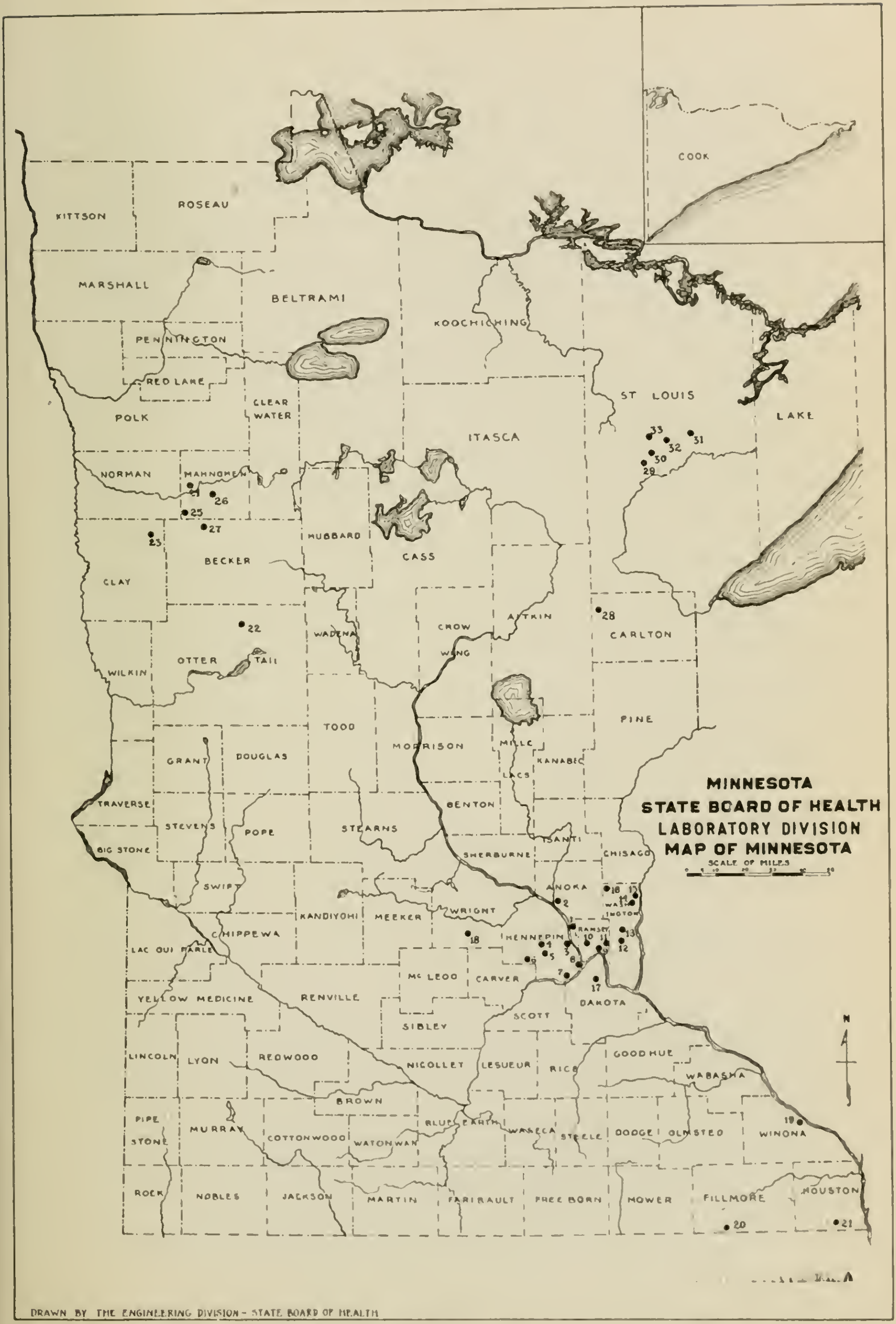
Under 6, conditions same as under 4.

Under 7, the material was in very bad condition in two cases. The third case was that of streptococcus meningitis in a horse. In all three cases the inoculated animals died of infection other than that of rabies.

Under 8, the material was so thoroughly decomposed that no examination was attempted.

TABLE B.—AN ANALYSIS OF RABIES EXAMINATIONS BY MONTHS.

	1910–1911		1911–1912		Total Positive	Total Suspected
	Positive	Suspected	Positive	Suspected		
August	0	2	3	6	3	8
September	6	8	2	2	8	10
October	2	4	1	3	3	7
November	1	1	6	6	7	7
December	0	0	4	7	4	7
January	5	8	7	7	12	15
February	1	2	3	5	4	7
March	2	3	6	8	8	11
April	2	3	7	13	9	16
May	2	4	2	4	4	8
June	1	4	11	17	12	21
July	3	3	3	4	6	7
	25	42	55	82	80	124



MAP No. 4
INFECTED LOCALITIES DURING YEAR ENDING JULY 31, 1912.

Table B. shows that rabies has prevailed throughout the two-year period. Of the specimens received during the summer months (36), 58% were from rabid animals, while of those received during the winter months (29), 69% were from rabid animals.

In order to show the prevalence of rabies in the state as indicated by investigations made in the State Board of Health Laboratories from 1896 to January 1, 1912, the following map, No. 5, has been prepared. Counties at some time infected are marked by the year or years in which one or more infected localities were shown to exist. The spread of the disease from a few infected foci in the late nineties, which for the most part were in and near the Twin Cities, to the infection of twenty-five counties in 1907 is here shown. The disease has penetrated as far north as the Iron Range in St. Louis county and to still farther northern points in Marshall and Beltrami counties. It has frequently existed in the extreme southern part of the state. It can be stated with great probability that rabies has traveled into the Dakotas from Minnesota. This is indicated by the earliest positive cases forwarded for examination from the Dakotas being received in 1905 and 1906, when it is seen that rabies had already traveled from the eastern half of this state to a number of the counties bordering on the Dakotas. Whether rabies entered Minnesota over the Wisconsin or Iowa boundary directly is not indicated by this map. A similar map giving the rabies history of our sister states would afford much interesting data. Owing to the large numer of cases of rabies which were called to our attention through the heavy registration of Pasteur patients during the first half of 1912, the following letter of inquiry was sent to the mnuicipal laboratories of St. Paul and Minneapolis, and to the laboratories of the State Live Stock Sanitary Board and the State Agricultural College:

Dear Doctor: We are preparing our biennial report and are endeavoring to obtain all the available information regarding rabies.

Dr. McDaniel would like to have some statistics upon the following points for each of the years 1911 and 1912:

(1) How many heads of animals suspected of rabies have been examined in your own laboratory?

(2) How many of these were positive?

(3) From what localities did the cases come?

(4) How many cases of rabies have been diagnosed without laboratory examination and from what localities?

Yours very truly,

....

M. Director.

The following letters of reply were received:

Department of Health,
St. Paul, Minn.,
August 1, 1912.

R. H. Mullin, M. D., Laboratory State Board of Health, Minneapolis, Minn.

Dear Doctor: In response to your request of July 31, 1912, I am pleased to forward to you the information asked for in the following questions:

1. How many heads of animals suspected of rabies have been examined in your laboratory? 1910, 21; 1911, 74; first six months of 1912, 39.

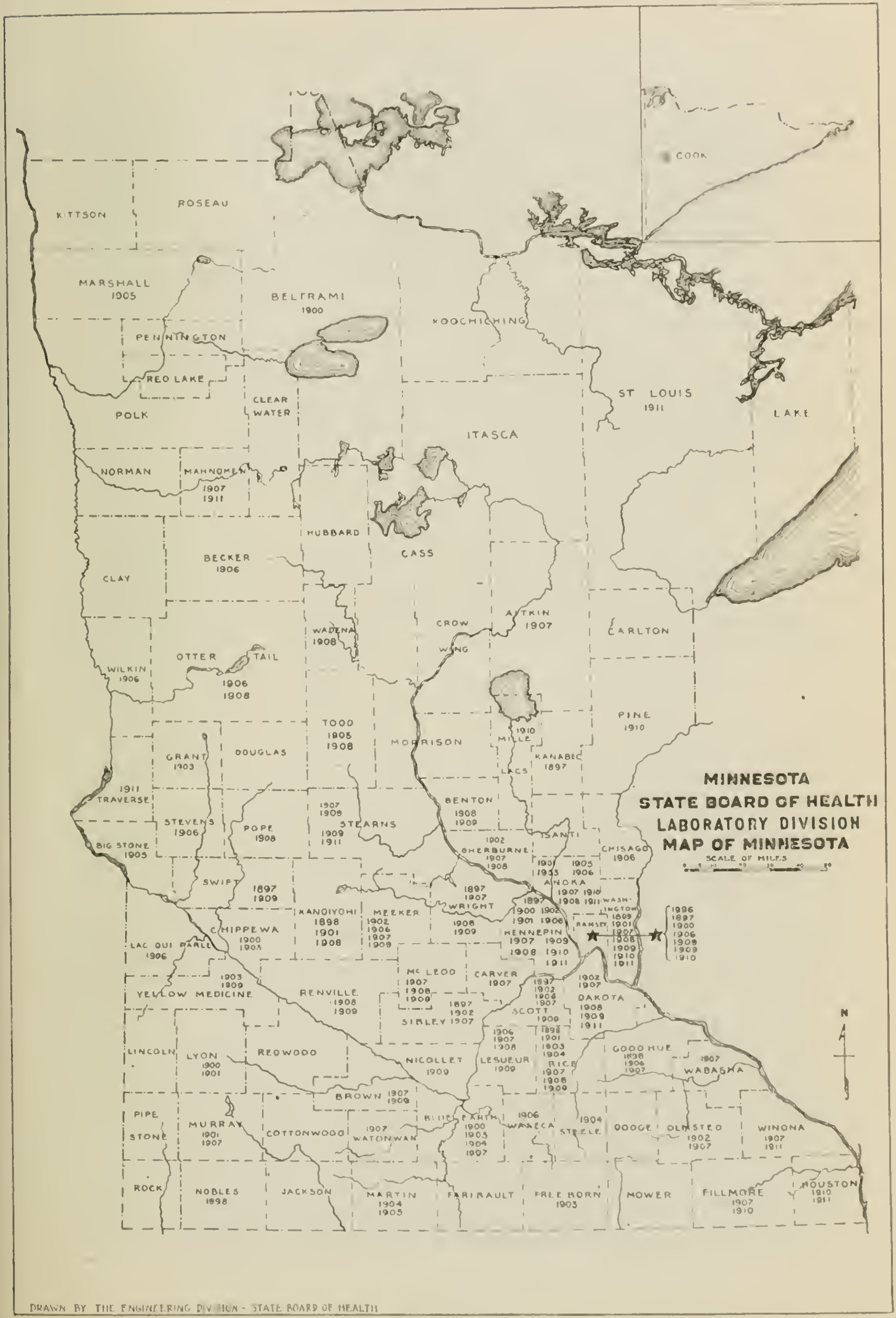
2. How many of these were positive? 1910, 11; 1911, 33; first six months of 1912, 20.

3. How many cases of rabies in animals have been diagnosed clinically without laboratory examinations? All our cases of rabies were confirmed by laboratory examinations.

You have our premission to quote these statistics in your biennial report.

Yours truly,

(Signed) P. B. COOK, M. D.,
Asst. Com. of Health.



DRAWN BY THE ENGINEERING DIVISION - STATE BOARD OF HEALTH

MAP No. 5

SHOWING COUNTIES INFECTED DURING SIXTEEN-YEAR PERIOD.

Health Department, City Hall,
Minneapolis, Minn.,
P. M. Hall, M. D., Commissioner of Health,
August 6, 1912.

Dr. R. H. Mullin, State Board of Health, University of Minnesota, City.

Dear Doctor: Replying to your letter of July 31st, I wish to make the following statement:

Number heads examined, 1911	25
Number heads examined, January to August, 1912	42
Number heads positive, 1911	17
Number heads positive, January to August, 1912	35
Number rabies diagnosed clinically, 1911	68
Number rabies diagnosed clinically, January to August, 1912	135

Yours respectfully,
HEALTH DEPARTMENT,
(Signed) J. F. Corbett, Bacteriologist.

State of Minnesota,
Live Stock Sanitary Board,
St. Paul, August 13, 1912.

Dr. R. H. Mullin, Director, S. B. H. Laboratory, Minneapolis, Minn.

Dear Doctor: Referring to your letter of July 31, requesting statistics covering rabies:

1. How many heads of animals suspected of rabies have been examined in your laboratory for the years 1911 and 1912? Fourteen.

2. How many of these were positive? Nine.

3. From what localities did these cases come? Two from Dakota county, two from Ramsey county, one from Traverse county, two from Hennepin county, and two from Washington county.

4. How many cases of rabies have been diagnosed without laboratory examination and from what localities? Four, as follows: From Anoka, Itasca, Norman and Ramsey counties.

Our veterinarians have made a large number of visits investigating rabies. It appears from our records that practically all our information covering outbreaks has been received through your courtesy, which is very much appreciated.

Very truly,
(Signed) S. H. WARD.

The University of Minnesota,
Department of Agriculture,
August 22, 1912.

Dr. R. H. Mullin, State Board of Health, Minneapolis, Minn.

Dear Doctor: Your letter of the 31st ultimo to Dean Woods has been referred to this division for reply.

By a recent arrangement with the State Live Stock Sanitary Board, laboratory diagnosis of infectious and contagious diseases of animals is now being carried on in the Bacteriology Section of this division. This, of course, includes the diagnosis of rabies from the brains of animals suspected of having been affected with this disease.

This work having only been recently started here, I cannot give you any exact data such as you ask for in your letter. Dr. Boyd, who has this work in charge, is now away on his vacation and his records are not accessible. However, I would estimate that about twenty brains have been examined here from dogs, cows and hogs; and of these I would say that the positive and negative cases were about evenly divided as far as the finding of Negri bodies is concerned. Our laboratory is not yet in condition for us to make histological examination or animal inoculation. This, of course, will be done as soon as possible to supplement the examination for Negri bodies in negative cases.

With reference to the localities from which the above cases were received, permit me to say that the majority were from St. Paul and vicinity. A few were received from other parts of the state.

I am sorry that I cannot give you more detailed information, but will refer your letter to Dr. Boyd on his return.

Yours truly,
HPH-H (Signed) H. PRESTON HOPKINS.

The foregoing reports of other laboratories have been added in order to complete, as far as possible, the record of rabies in Minnesota.

PASTEUR INSTITUTE.

The Pasteur Department of the Minnesota State Board of Health was opened August 1, 1907. From this date to August 1, 1912, 852 persons were registered for treatment. A summary of these cases is given at the end of this report. The treatment is free to all residents of Minnesota. The treatment lasts twenty-one days and is given daily at 10:30 A. M. at the Institute, which is located on the University Campus, Minneapolis. A fee of $100 is charged non-residents. This fee is paid into the state treasury.

The treatment used is essentially the same as that first given to the world by Pasteur, more than twenty years ago. Minor modifications which have been adopted by many other institutes both in this country and abroad are used. The treatment consists of daily subcutaneous injections of portions of the dried spinal cord of a rabbit dead of fixed rabies virus. By "fixed" virus is meant a rabies virus that produces in the rabbit symptoms of rabies at the end of a definite or fixed number of days following its subdural or intracerebral inoculation into the rabbit. "Street" virus means the virus in nature, i. e., as it is commonly found in dogs, in the street. Street virus when inoculated into rabbits produces symptoms in from twelve to twenty-one days or a longer period of time. Fixed virus is prepared by passing the virus from a rabid dog (street virus) or other rabid animal through a long series of rabbits. After the first few passages the period of invasion gradually becomes shorter and shorter till the fixed period of six days is reached.

The cord is removed from the rabbit under the strictest aseptic precautions, a portion of the medulla being reserved to inoculate other rabbits. The cord is at once suspended over potasium hydrate and placed for drying in a dark room which is kept at a temperature of about 68 degrees F. A fresh cord is hung each day, and the cords are kept in series up to twelve days. This necessitates having one rabbit die each day from fixed virus infection. In order to be sure of having one rabbit die each day two rabbits are intracerebrally inoculated each day from the medulla of a rabbit dead from a previous intracerebral inoculation of fixed virus.

The first injection given a new patient is from a cord that has been dried twelve days. Step by step the number of days of drying is diminished until a cord that has been drying but three days is given. From this time until the end of treatment the stronger cords, i. e., cords that have been drying but five, four and three days, are repeated in sequence. The cord is prepared daily for injection by rubbing it into sterile physiological salt solution, and this suspension is injected into the patient very soon after its preparation. The injections are made into the anterior abdominal wall a little below the waist line. The course of treatment lasts twenty-one days, most patients receiving but one injection daily. Patients appearing for treatment later than two weeks following the infliction of the bite, and patients bitten upon the head are treated more than once daily for the first few days, the total course of treatment covering the same time, however.

DETAILS OF METHODS.

Method of Removing Cord—The doors and windows of the room are closed to prevent air currents. The rabbit is wetted thoroughly to prevent hairs blowing about, then placed, face downward, and hooks attached to the table, are inserted under the tendo Achilles. The skin is reflected over the head of the rabbit after cutting through the skin encircling the body just anterior to the base of the tail. If any hairs are attached to the muscles over the lower back region, the muscles are seared with a hot soldering iron. The muscles are dissected away from the vertebrae, the spinous processes of the vertebrae are clipped off with heavy curved scissors, and the spinal cord is laid bare by cutting through the vertebrae on either side of the cord. A portion of the medulla for the inoculation of two other rabbits is removed, placed in a sterile Petri dish, and set aside. The spinal nerves are severed with scissors, leaving the meninges intact. A sterile thread, held in sterile forceps and bearing a loop in one end, is slipped over the upper end of the cord and tightened about it. The cord is lifted by means of the thread and freed from its canal down to the middle point, where it is cut transversely, and half of the cord is lowered into an aspirator-jar containing potassium hydrate. In like manner the lower half of the cord is hung. The sterility of each cord is determined by broth cultures.

Instruments and Accessories.

Operating table bearing
- 1 sterile 2-litre aspirator-jar with openings on top and side near bottom, containing potassium hydrate, the openings plugged with cotton.
- 1 Petri dish containing sterile threads with loops.
- 1 empty sterile Petri dish.
- 1 tray containing the following sterile instruments:
    - 3 scalpels,
    - 1 pair heavy curved scissors,
    - 1 pair special bone-forceps,
    - 2 pairs tissue-forceps,
    - 1 pair small scissors.
- 1 head-block.
- 1 pair blunt-pointed scissors (not sterilized) for incising the skin.

Attached to the end of the table are two chains with hooks to be hooked beneath each tendo Achilles of the rabbit (as done by the New York Municipal Board of Health Laboratory). Near at hand also is a soldering iron set over a flame.

Method of Inoculating Rabbits—As soon as the cord is hung and put away the portion of the medulla that was reserved in a Petri dish is rubbed into a few c.c. of physiological salt solution by means of a spatula, and two rabbits are inoculated as follows: The rabbit is rolled for convenience in a roller towel and held by an assistant. The hair over the site of the operation has already been clipped. The skin and hair on the top of the head are thoroughly moistened with 5 per cent phenol solution. A longitudinal incision about 2 cm. long is made about 1 cm. to the left of the median line, the mid-point of the incision being in line with the posterior angle of the eye. The skin is drawn to the right of the median line, and by rotating the point of the scalpel an opening in the skull is made. Through this opening the syringe needle is passed, the needle being directed into the left ventricle, as practiced by Cumming of Ann Arbor. Less than 0.2 c.c. of the emulsion of the medulla is injected. The skin surface about the incision is dehydrated with alcohol, and the wound sealed with cotton and collodion. Symptoms develop on the sixth day, and the rabbits die in seven days from the day of inoculation. Two rabbits are inoculated each day, to insure against interruption of the series.

Instruments and Accessories.

Table bearing

- 1 small covered dish containing 5 per cent phenol solution.
- 1 small covered dish containing alcohol.
- 1 bottle of collodion.
- 1 box containing sterile cotton sponges. (Formerly plugs from empty sterile test-tubes were used for this purpose. These proved to be so convenient as to size, shape, and preparation, that brass tubes, plugged at both ends and sterilized in a copper container, have been substituted for the open basket of sterile plugged tubes.)
- 1 basket containing tubes of sterile physiological salt solution.
- 1 Bunsen burner.
- The Petri dish containing medulla.
- 1 tray containing the following sterile instruments:
  - 1 spatula,
  - 1 2-c.c. glass syringe,
  - 1 scalpel.

Method of Grinding Cord—The doors and windows are closed. The required lengths of cords to be used are cut off the proper aged cords into conical glasses, using as many glasses as there are different strengths of cord to be used. With a heavy glass rod the cord is broken down, rubbed smooth, and gradually physiological salt solution is added until the proper amount is reached. One-sixth inch of cord is rubbed into 3 c.c. of salt solution, and 2 c.c. of this suspension is injected at one time. When two cords are used in one injection (see outline for treatment) a double quantity or 4 c.c. is injected. The sterile glasses containing the freshly prepared suspensions are placed in a special ice-cooler during the hour devoted to injecting the patients.

Instruments and Accessories.

In cord closet

- 2 shelves bearing jars of cords from 1 day to 12 days.
- 1 table bearing
  - 1 Bunsen burner for flaming forceps and scissors.
  - 1 pair forceps.
  - 1 pair scissors with measure on side.
  - Required number of conical test-glasses. (These glasses, together with covers of circles of filter paper folded about the tops, have been previously sterilized. On the paper cover in each case is written a number indicating the strength of the cord, i. e., the number of days it has been drying and below the names of patients who are to receive the same.)

In room proper

- 1 table bearing
  - 1 Bunsen burner,
  - 1 basket of tubes of physiological salt solution.
  - 1 sterile graduated pipette.
  - 1 packet of sterile glass rods.
  - The conical glasses containing measured quantities of cord.

Outline for treatment—ordinary.

Day of treatment	1	2	3	4	5	6	7	8	9	10	11	12	
Cord	12&11	10&9	8&7	6	6	5	4	3	5	4	3	5	and so on to 21
C. C.	4	4	4	2	2	2	2	2	2	2	2	2	

Outline for treatment—intensive.

Day of treatment	1	2	3	4	5	6	7	8	9	10	11	12	
A. M.		10&9	6	5	3	4							
Cord	12&11						5	4	3	5	4	3	and so on to 21
P. M.		8&7	6	4	5	3							
C. C.	4	4	2	2	2	2	2	2	2	2	2	2	

Indications for Treatment—All persons bitten or scratched either by the teeth or claws of a rabid dog or other rabid animal should receive the Pasteur preventive treatment for rabies.

All persons having wounds upon the hands, face, or elsewhere upon the body that have come in contact with a rabid animal in such a manner that the saliva of the animal has gained entrance into these wounds should likewise receive the preventive treatment.

All persons bitten by or otherwise exposed to infection from an animal within a period of two weeks preceding the development of symptoms of rabies in the animal should receive treatment. Four to six days is usually reported as the limit of time preceding the onset of symptoms of rabies, in which rabies virus has been shown experimentally in the saliva of a dog. The above time limit of two weeks has been fixed upon by this department as a proper one to guard against all possibility of danger.

Persons bitten, etc., earlier than two weeks before the exhibition of symptoms of rabies in the animal are in no danger of the development of rabies. In other words, if the offending dog is living and well at the end of two weeks from the date of biting, it is certain that the animal did not have rabies at the time of the biting and could not have had rabies virus in his saliva at that time.

All persons exposed to possible infection from a known rabid animal, and all persons exposed to possible infection in a suspected rabid animal or in an animal in which it is impossible to exclude rabies at once as outlined under "Diagnosis in the Living Dog" should be sent for treatment.

All such persons should be sent to the Institute without waiting for a report upon the examination of the head of the animal.

PASTEUR CASES.

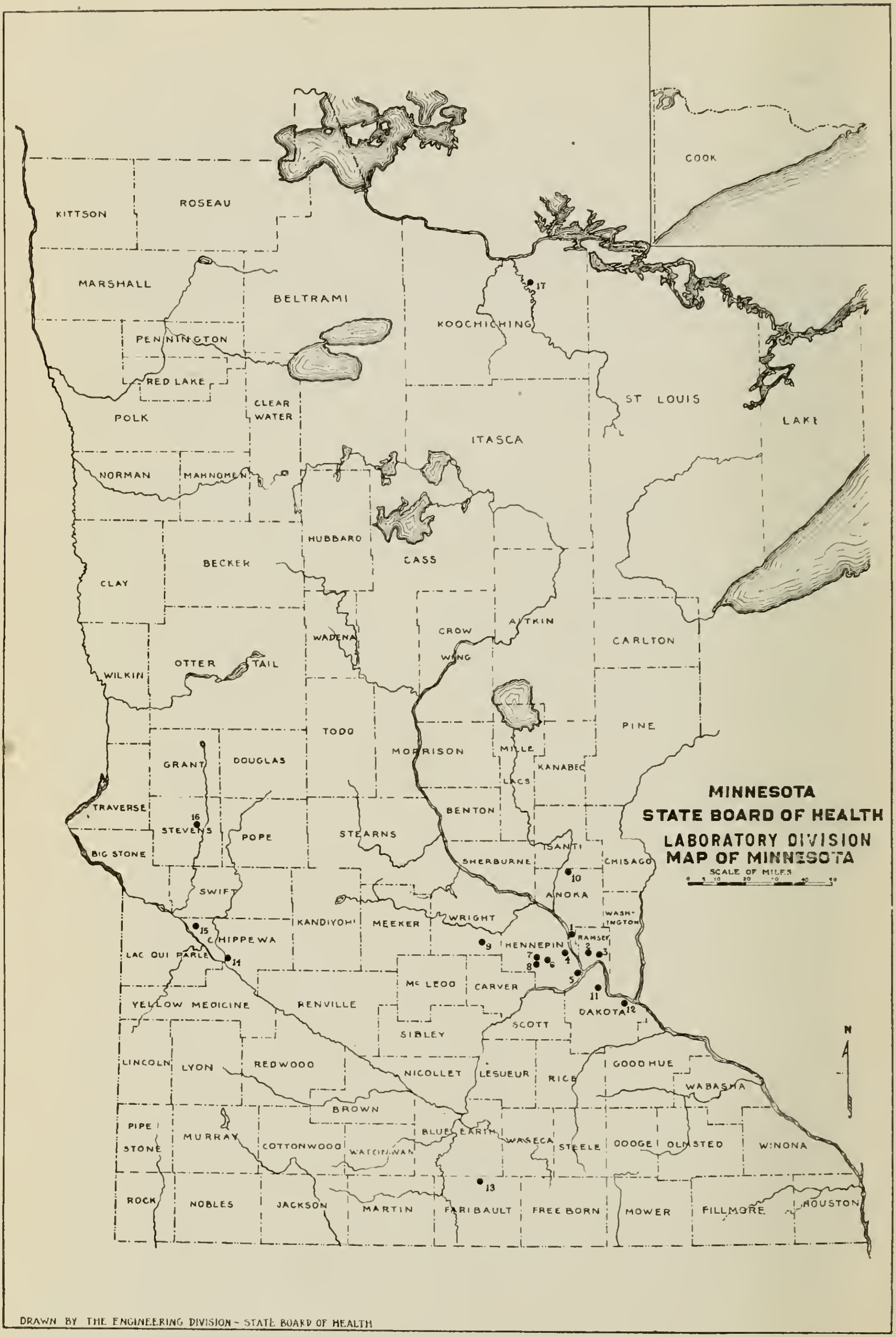
During the biennial period ending July 31, 1912, 381 persons were registered for the Pasteur preventive treatment for rabies. Two hundred and twenty-five animals—200 dogs, fourteen cats, eight bovines, two horses and one mule were implicated in infecting these persons.

Of the 134 persons who were treated during the year ending July 31, 1911, 115 came from seventeen localities in Minnesota as shown in the accompanying map, No. 6, and nineteen from nine localities outside of the state.

LIST OF PLACES, GIVING NUMBER OF TREATED PERSONS FROM EACH PLACE FOR THE YEAR ENDING JULY 31, 1911.

(Numbers 1-17 correspond to numbers on map.)

1.	Fridley, Anoka county	2
2.	Rose township, Ramsey county	3
3.	St. Paul, Ramsey county	32
4.	Minneapolis, Hennepin county	56
5.	Ft. Snelling	1
6.	Hopkins, Hennepin county	1
7.	Deephaven, Hennepin county	7
8.	Minnetonka township, Hennepin county	1
9.	Montrose, Wright county	1
10.	Bethel, Anoka county	3
11	Inver Grove township, Dakota county	1
12.	Hastings, Dakota county	1
13.	Frost, Faribault county	1
14.	Montevideo, Chippewa county	1
15.	Milan, Chippewa county	1
16.	Morris, Stevens county	2
17.	Little Fork, Koochiching county	1
	Ellendale, North Dakota	2
	Glanavan township, North Dakota	1
	Wimbledon, North Dakota	2
	Valley City, North Dakota	2
	Effington, South Dakota	4
	Huron, South Dakota	1
	Newark, South Dakota	2
	Pierre, South Dakota	4
	Near Hanna, Wyoming (unorganized district)	1



MAP No. 6
LOCALITIES FROM WHICH TREATED PERSONS CAME DURING YEAR ENDING JULY 31, 1911.

Of the 247 persons who were treated during the year ending July 31, 1912, 243 came from thirty-six localities in Minnesota, as shown in the accompanying map, No. 7, and four from four localities outside of the state.

LIST OF PLACES, GIVING NUMBER OF TREATED PERSONS FROM EACH PLACE FOR THE YEAR ENDING JULY 31, 1912.

(Numbers 1-36 correspond to numbers on map.)

1.	Lake Elmo, Washington county	3
2.	Grant township, Washington county	1
3.	Withrow, Washington county	1
4.	Stillwater, Washington county	2
5.	New Scandia township, Washington county	1
6.	North St. Paul, Ramsey county	2
7.	St. Paul, Ramsey county	56
8.	Rose township, Ramsey county	6
9.	Fridley, Anoka county	2
10.	Anoka, Anoka county	1
11.	Minneapolis, Hennepin county	124
12	Richfield, Hennepin county	1
13.	Ft. Snelling	1
14.	Bloomington, Hennepin county	2
15.	Hopkins, Hennepin county	4
16.	Excelsior, Hennepin county	5
17.	Minnetrista township, Hennepin county	1
18.	West St. Paul, Dakota county	2
19.	Inver Grove township, Dakota county	2
20.	Hastings, Dakota county	1
21.	Farmington, Dakota county	2
22.	Woodland township, Becker county	1
23.	Hutchinson, McLeod county	1
24.	Traverse township, Nicollet county	2
25.	Wright, Carlton county	2
26.	Granger, Fillmore county	4
27.	Winnebago township, Houston county	3
28.	Montevideo, Chippewa county	1
29.	Dawson, Lac qui Parle county	1
30.	Perham, Otter Tail county	1
31.	Ulen, Clay county	1
32.	Waubun, Mahnomen county	2
33.	Virginia, St. Louis county	1
34.	Iron Junction, St. Louis county	1
35.	McKinley, St. Louis county	1
36.	Aurora, St. Louis county	1
	Enderlin, North Dakota	1
	Effington, South Dakota	1
	Faulkton, South Dakota	1
	Alberta, Canada	1

An analysis of the 381 treated cases is given in Tables C. and D.

Tables C. and D. are based upon the classification used at the Pasteur Institute in Paris, but present certain modifications.

Class I includes persons bitten or otherwise infected by animals in to have had rabies.

Class II includes persons bitten or otherwise infected by animals in which a diagnosis of rabies was based upon clinical grounds.

Class III includes persons bitten or otherwise infected by animals suspected of having rabies.

Under "Bitten" and "Otherwise Infected" all three classes are redivided into those frankly bitten and those in whom the atrium of infection was caused in some other way than by the teeth of the offending animal. Each of these divisions are subdivided into three groups according to location of the bite, upon head, hands, other parts of the body.

Class I is also subdivided into (a) persons bitten or otherwise infected by animals in which Negri bodies could not be demonstrated in the central nervous system of the suspected animals, a diagnosis of rabies being made through animal inoculations, and (b)* persons bitten or otherwise infected by animals in which a diagnosis of rabies was based upon the finding of Negri bodies in the central nervous system of the suspected animal.

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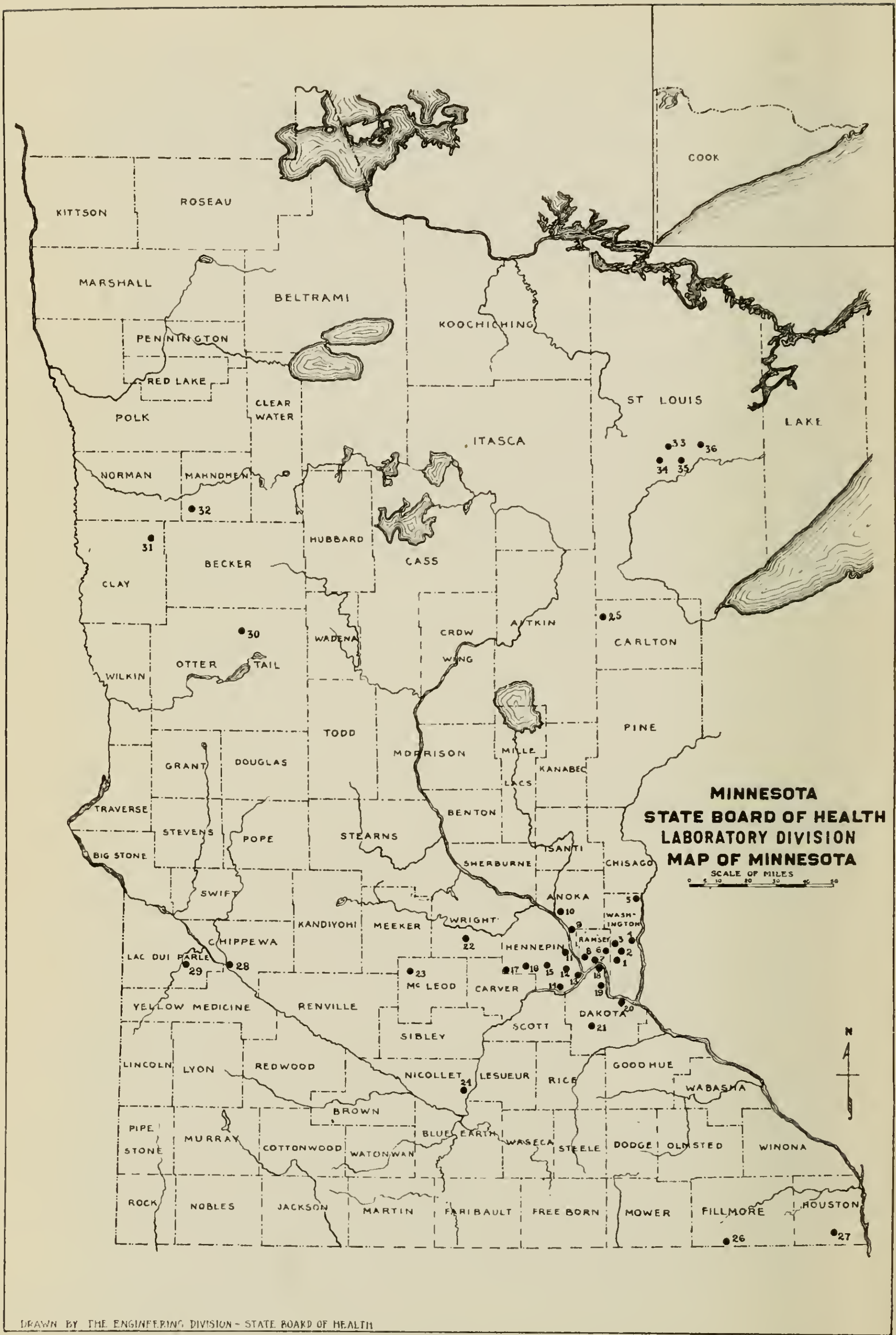
*Our previous results, together with the results of many others, have led us to believe that true Negri bodies, when found, are diagnostic of rabies. See Diagnosis and the Pasteur Preventive Treatment of Rabies (vide ante).



MAP No. 7
SHOWING LOCALITIES FROM WIHCH TREATED PERSONS CAME DURING YEAR ENDING JULY 31, 1912.

TABLE C.—CASES TREATED DURING YEAR ENDING JULY 31, 1911.

	Bitten			Otherwise Infected			
	Head	Hands	Other Parts	Head	Hands	Other Parts	Total
Class I a	......	3	1	....	1	....	85
b	5	38	11	1	23	2	
Class II	....	5	2	3	13	....	23
Class III	2	14	10	....	....	....	26
Total	7	60	24	4	37	2	134

Note 1 to Table C.—Treatment was discontinued after the first injection by two persons belonging to Class III. without any reason being given.

Note 2 to Table C.—The examinations of thirty-one animals infecting sixty persons included in Class I were made in other laboratories as follows: Fourteen in the City Board of Health Laboratory, Minneapolis; twelve, City Board of Health Laboratory, St. Paul; one, State Live Stock Sanitary Board, St. Paul; two, North Dakota Agricultural College, Fargo, N. D.; one, State Health Laboratory, Vermillion, S. D., and one, South Dakota State College of Agriculture and Mechanic Arts, Brookings, S. D.

Table C. shows that eighty-five treated persons were bitten or otherwise infected by animals proven through laboratory examination to have had rabies. Twenty-three persons were bitten or otherwise infected by animals in which a clinical diagnosis of rabies was made. There were twenty-four persons bitten or otherwise infected by dogs merely suspected of having rabies. In seven instances in Class III, treatment was unnecessarily given, for, through laboratory examination, the offending animal was proven not to have had rabies. In one case the laboratory examination was unsatisfactory. In the remaining sixteen cases of Class III the dog was not traced, escaped, or the animal was killed and the head was not sent for examination.

TABLE D.—CASES TREATED DURING YEAR ENDING JULY 31, 1912.

	Bitten			Otherwise Infected			
	Head	Hands	Other Parts	Head	Hands	Other Parts	Total
Class I a	....	3	2	......	1	2	172
b	13*	72	33	4	42	....	
Class II	2	12	7	4	17	1	43
Class III	5	13	14	....	....	....	32
Total	20	100	56	8	60	3	247

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*Case 828, included in this group, developed rabies four days following completion of treatment, see page 371 of this report.

Note 1 to Table D.—In two persons belonging to Class III, treatment was discontinued after three days and one day, respectively, for the reason that the offending animal in each case was traced and found to be normal.

Note 2 to Table D.—The examinations of fifty-six animals infecting one hundred and twenty persons included in Class I were made in other laboratories as follows: Thirty-three in the City Board of Health Laboratory, Minneapolis; twenty-three in the City Board of Health Laboratory, St. Paul, and one in the South Dakota State College of Agriculture and Mechanic Arts, Brookings, S. D.

Table D shows that 172 persons treated were bitten or otherwise infected by animals which were shown through laboratory examination to have had rabies.

Forty-three persons were bitten or otherwise infected by animals in which a clinical diagnosis of rabies was made.

Thirty-two persons were bitten or otherwise infected by animals suspected of having rabies. In three instances in Class III the offending animal was shown, through the inoculation of laboratory animals, not to have had rabies. In the twenty-nine remaining cases of Class III the dog was not traced, escaped, or the animal was promptly killed and the head not sent for examination.

One death from rabies in those treated during this biennial period has occurred.*

Case 828—Mr. W., aged 58, attorney, a strong and vigorous man, who lived a very active and thoroughly temperate life, was bitten on July 7, 1912. The wounds consisted of one deep tooth puncture on end of nose and an abrasion, three-fourths of an inch in diameter, over the edge of upper lip. The wounds were not treated until July 9, when patient first went to a physician. The physician opened wound and cauterized and sent patient to this department. Treatment was begun on the same day and the "intensive" schedule followed, i. e., two treatments daily were given during first five days. The treatment was concluded on July 29 (twenty-one days).

Four days later, following an automobile ride in the evening of Friday, August 2, patient had chilly sensations and a feeling of fullness in his head. On Saturday patient had little appetite and ate very little in the morning and at noon time. Saturday evening patient left table, since swallowing gave disagreeable sensations in region of throat. On Sunday morning he was practically unable to swallow. Any attempt to do so brought on painful spasm of muscles in region of throat and diaphragm. During the forenoon it was noticed that these spasms were brought on by any sudden movement on the part of the patient and by slight waves of air as in adjusting the bed clothing. General movements of limbs and respiratory muscles accompanied the spasms of the throat and diaphragm as though voluntary effort was put forth to control them. The patient himself thought that this effort helped in reducing the intensity and duration of the spasms. General convulsions were not present at any time. Patient's mind was clear throughout the day Sunday. He talked freely and naturally except when halted by a spasm. He was at no time apprehensive.

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*Death occurred August 6, 1912, but is recorded in this biennial report in order to complete the record of the case in one report.

though thoroughly knowing the meaning of his condition, but possessed courageous hope to overcome the disease through his unusual physical vigor. About midnight he became restless and it was necessary to forcibly keep him in bed. At 2 A. M. chloroform was administered carefully drop by drop upon a face mask. It was necessary to use a small amount of chloroform throughout most of Monday until about 4 P. M. There were, however, frequent intervals from a few minutes to half an hour in which no chloroform was given. During such intervals the patient gave evidence of understanding what was said or done, though speech was practically impossible. From 4 o'clock on the patient was quiet, but became rapidly weaker, dying from exhaustion at 2 A. M. Tuesday, August 6. He directed his physicians to "fight" only about six hours before death. The patient recognized members of his family only a few hours before death. Examination showed Negri bodies in ammonshorn. Two rabbits inoculated from a portion of the brain developed symptoms of rabies and died on the seventeenth and eighteenth day, respectively, following the inoculation. Negri bodies were found in the central nervous system of both of these rabbits.
not advised.

In addition to 381 persons treated, 187 persons applied for advice but were not treated, the reason being in most cases that the offending animal was living and well at the time of the application. Such persons were advised to keep the animal under observation for a period of two weeks following the biting and to return at once to receive the preventive treatment for rabies should the dog become sick, die, be killed, or disappear from home within the two weeks period. In a few of the above cases there was more or less association with a rabid animal on the part of the applicant, but the opportunity for infection was so remote that treatment was not advised.

TABLE E.—ANALYSIS OF APPLICANTS BY MONTHS.

	Treated			Not Treated	Treated			Not Treated	Total Applicants During Biennial Period
	Class I and II	Class III	Total		Class I and II	Class III	Total		
August	3	2	5	8	7	6	13	11	37
September.	12	2	14	3	5	2	7	5	29
October	18	1	19	4	8	0	8	9	40
November	10	1	11	4	18	1	19	4	38
December	8	0	8	2	10	2	12	5	27
January	8	5	13	4	25	3	28	7	52
February	1	2	3	8	31	4	35	6	52
March	3	1	4	4	8	1	9	9	26
April	4	0	4	7	28	1	29	14	54
May	9	2	11	10	21	4	25	12	58
June	2	6	8	10	28	3	31	16	65
July	30	4	34	6	26	5	31	19	90
Total	108	26	134	70	215	32	247	117	568

Table E. shows that for this biennial period, while more applications for treatment were received and more patients treated during the summer months than during the winter months, it was found advisable to treat a larger proportion of the persons applying during the winter months. While 67 per cent of the summer applicants received treatment, 76 per cent of those applying in winter were treated. In winter, too, a greater percentage of the cases treated are exposed to infection in animals known to have had rabies through laboratory examination, and by animals pronounced rabid from clinical history, than in summer. Fifty-two per cent of the cases treated in summer fall into Classes I and II, while 63 per cent of the cases treated in winter fall into these two classes.

TABLE F.—SUMMARY OF CASES BY YEARS FROM OPENING OF PASTEUR INSTITUTE.

	Year Ending July 31, 1908		Year Ending July 31, 1909		Year Ending July 31, 1910		Year Ending July 31, 1911		Year Ending July 31, 1912		Total	
	Trtd.	Dths.	Trtd.	Dths.	Trtd.	Dths.	Trtd.	Dths.	Trtd.	Dths.	Trtd.	Dths.
Class I..	136	0	108	1	48	0	85	0	172	*1	549	2
Class II.	43	0	12	0	5	0	23	0	43	0	126	0
Class III	33	0	57	0	29	0	26	0	32	0	177	0
Total...	212	0	177	1	82	0	134	0	247	1	852	2

*Death occurred eight days after the conclusion of treatment.

It is customary to exclude from the death rate or percentage of failures following treatment, all deaths from rabies occurring within two weeks from the completion of treatment, the reason for this being that death occurs before sufficient time has intervened for protection to be established. The death rate following treatment during a period of about twenty-five years at the Pasteur Institute, Paris, is about four-tenths of 1 per cent. The above record is therefore a pleasing and satisfactory one. It is to be expected, however, that this death rate will be raised very probably within another five-year period.

BRANCH LABORATORIES.

At present there are two branches of the Laboratory Division of the State Board of Health, one situated at Duluth and the other at Mankato.

DULUTH BRANCH.

The Duluth Branch was established in 1905, and has been in continuous operation ever since. The arrangements then entered into between the State Board of Health, the City of Duluth and St. Louis county still obtain. A trained observer from the laboratory staff is in charge of the laboratory, devoting part only of his time to laboratory work. The territory served by this laboratory is Duluth and St. Louis county. This arrangement has been found very satisfactory inasmuch as considerable time is saved in the transportation of specimens, so that physicians may receive reports anywhere from twenty-four to forty-eight hours earlier than they would if they were to send the specimens to the main laboratories in Minneapolis. More than this, the City of Duluth is provided with a laboratory in which all public health laboratory matters pertaining to Duluth can be taken care of at an exceedingly low cost to the City of Duluth. A good deal of the success that has been obtained in the Duluth Branch has been due to the untiring efforts and energy of Dr. E. L. Tuohy, who had been in charge since its inception. However, in February, 1912, Dr. Tuohy was compelled, on account of pressure from increasing demands of his practice, to resign the charge of the Duluth Branch. He was succeeded by Dr. T. R. Martin, who was then head of the Diagnostic Subdivision of the Main Laboratories.

The routine work in the Duluth Branch consists of the examinations for diphtheria, typhoid and tuberculosis along the same lines as obtain in the main laboratories. The results of the work done in the biennial period are tabulated below in Table XI. In addition, the laboratory at Duluth undertakes other work more or less intimately connected with the City of Duluth. This comes under two heads: the examination of milk for the purpose of determining whether or not it may be labeled "Certified" or "Inspected;" and the routine daily examination of the water supply of Duluth. The routine examination of milk supplies was undertaken at the request of the Medical Milk Commission of the St. Louis County Medical Society. After a conference between this commission and representatives from the State Board of Health it seemed advisable to make suitable provisions so that dairies might under certain conditions be given credit for producing what is known as inspected milk. In the regulations of the State Board of Health inspected milk is defined as having the same requirements as certified milk except that the bacterial count may run as high as 100,000. These arrangements between the Duluth Branch Laboratory and the Duluth Medical Milk Commission were completed in April, 1912, and the work commenced, since when regular examination of such dairies as have been designated by the Duluth Medical Milk Commission have been investigated. These number fourteen dairies. Out of the dairies investigated, eight have on the recommendation of the Duluth Branch been given certificates to issue inspected milk. In addition all of the dairies supplying milk to the citizens of Duluth have been investigated and counts made at the request of the city health officer.

DULUTH CITY WATER SUPPLY.

In May, 1912, the Water and Light Commission of the City of Duluth became anxious to take such steps as would insure to the citizens of Duluth an absolutely pure water supply. After some correspondence with the executive officer of this Board, a conference was held between the Water and Light Commission and representatives of the State Board of Health. At this time it was determined that a preliminary survey would be necessary to acquire a knowledge of certain facts relative to the Duluth water supply. This preliminary survey indicated that there was a possibility of contamination entering the water supply of Duluth. Two plans were suggested; the first one of which suggested a complete survey extending over a considerable period of time to determine as nearly as possible what factors entered into the contamination of the water supply of Duluth. The second plan was to install an emergency hypochlorite plant and at the same time to make daily examinations of the water and apply the chemical treatment where such was indicated from the results obtained. Samples were to be taken from the intake and from the various reservoirs in Duluth. At a second conference, it was decided to proceed with the daily examination of samples to determine if any further steps were necessary. The results which have been obtained will be recorded in the next biennial report.

TABLE XI—SHOWING ROUTINE EXAMINATIONS IN THE DULUTH BRANCH.

	Diphtheria	Typhoid	Sputums	Milk	Water
Aug. 1, 1910, to July 31, 1911, incl....	4490	746	390	35	65
Aug. 1, 1911, to July 31, 1912, incl....	2327	401	552	135	41

MANKATO BRANCH.

In November, 1911, a request was made through the executive officer of the board for a branch of the State Board of Health in the City of Mankato. This request came almost unanimously from the physicians at Mankato. The funds of the board available for this purpose would not permit of an establishment of a laboratory devoted wholly to State Board of Health work in the City of Mankato, although the advisability of such a course was apparent to all concerned. Conferences were held between a committee representing the physicians of Mankato and representatives of the State Board of Health and it was finally determined advisable to establish a branch laboratory in Mankato, which was to serve in part the public health interests in Mankato and in part as a clinical laboratory for physicians of Mankato. An arrangement of this kind was made between the physicians of Mankato and the State Board of Health on the understanding that such a procedure would be in the nature of an experiment and would continue only provided the legislature would appropriate sufficient funds for the maintenance of the laboratory in Mankato.

The laboratory was installed in February, 1912, under the charge of Dr. C. C. Pratt, who had formerly seen some service in the main laboratories and in the North Dakota Public Health Laboratories. The laboratory is situated in the Immanuel Hospital in quarters provided by the hospital authorities. The equipment was obtained from the equipment of the main laboratories. The salary of Dr. Pratt is paid in part by the State Board of Health. For the remainder he is dependent upon a guarantee fund instituted by the physicians of Mankato. It is to be sincerely hoped that the legislature will appropriate sufficient funds to place this laboratory on its own footing so as to make it an independent branch of the State Board of Health Laboratory Division. In this way it would be possible to make the laboratory serve the public health interests not only of the City of Mankato, but also of the country surrounding Mankato which would act as a tributary to the Mankato Branch.

The following table will indicate the amount of work which has been done in the Mankato Branch Laboratory since its inception. Naturally these figures are not large, inasmuch as the use of the laboratory is restricted to Mankato alone, but undoubtedly if its establishment as a public health laboratory be maintained so that it can serve the surrounding districts the amount of work done in the laboratory will be greatly increased, as it would save anywhere from twenty-four to forty-eight hours of the time usually required to send reports to physicians in the country tributary to it.

TABLE XII—SHOWING WORK DONE AT MANKATO BRANCH SINCE ITS INCEPTION, FEBRUARY 1, 1912, TO JULY 31, 1912.

Diphtheria	Typhoid	Sputum	Miscellaneous	Total
81	33	82	5	201

RESEARCH WORK.

The following technical papers have been reported during this period.

1. An Analytical and Epidemiological Study of Farm Water Supplies. By Karl F. Kellerman and H. A. Whittaker. American Journal of Public Hygiene, Vol. XX, No. 3.
2. The Hypochlorite Treatment of Potable Waters. By H. A. Whittaker. Proceedings Minnesota State Santiary Conference.
3. The Traveling or Portable Hypochlorite Water Disinfecting Plant of the Minnesota State Board of Health. By J. A. Childs and H. A. Whittaker. Engineering News, Vol. 65, No. 14, April, 1911, pp. 402 and 403.
4. The Resistance of Certain Bacteria to Calcium Hypochlorite. By F. F. Wesbrook, H. A. Whittaker and B. M. Mohler. Journal American Public Health Association, Vol. 1, No. 2, February, 1911.
5. The Source, Manufacture and Composition of Commercial Agar Agar. By H. A. Whittaker. Journal American Public Health Association, Vol. 1, No. 9, September, 1911.
6. The Public School Well Problem. By H. A. Whittaker. Proceedings Minnesota State Santiary Conference, 1911.
7. A Synthetic Milk Medium. By H. A. Whittaker. Journal American Public Health Association, Vol. 2, No. 3, March, 1912.
8. The Sterilization of Milk Bottles with Calcium Hypochlorite. By H. A. Whittaker and B. M. Mohler. Journal American Public Health Association, Vol. 2, No. 4, April, 1912.
9. The Development of the Hypochlorite Treatment of Drinking Waters. Proceedings Minnesota Pathological Society, 1912. By H. A. Whittaker.
10. The Biology of Treponema Pallidum. By R. H. Mullin. Proceedings Minnesota Pathological Society.
11. Bacteriological Diagnosis in Diphtheria. By T. R. Martin. Proceedings Minnesota Pathological Society.
12. Vaccines and Vaccine Therapy. By R. H. Mullin. Read before the Blue Earth County Medical Society.
13. Rabies. By O. McDaniel. Read before American Association for Advancement of Science.

R. H. MULLIN,
Director Laboratory Division.

TABLE

SHOWING ANALYTICAL DATA ON

Lab. No.	Date Collect	City or Town	Map Location	Specific Location	Source
12442	5-25-12	Anoka......	Station No. 1, above State Asylum..............	100 ft. above bend in river..	Rum River.......
12481	6- 4-12	Anoka......	"	"	"
12491	6-11-12	Anoka......	"	"	"
12512	6-18-12	Anoka......	"	"	"
12535	6-25-12	Anoka......	"	"	"
					Average......
12443	5-25-12	Anoka......	Station No. 2, below State Asylum................	Bridge at pumping station..	Rum River ......
12482	6- 4-12	Anoka......	"	"	"
12492	6-11-12	Anoka......	"	"	"
12513	6-18-12	Anoka......	"	"	"
12536	6-25-12	Anoka......	"	"	"
					Average......
12445	5-25-12	Anoka......	Station No. 3, below Anoka.	400 ft. from mouth of river.	Rum River.......
12483	6- 4-12	Anoka......	"	"	"
12593	6-11-12	Anoka......	"	"	"
12515	6-18-12	Anoka......	"	"	"
12538	6-25-12	Anoka......	"	"	"
					Average......
12444	5-25-12	Anoka......	Station No. 4, bridge, Champlin to Anoka...........	Middle of bridge..........	Missippi River....
12484	6- 4-12	Anoka......	"	"	"
12495	6-11-12	Anoka......	"	"	"
12517	6-18-12	Anoka......	"	"	"
12540	6-25-12	Anoka......	"	"	"
					Average......
12446	5-25-12	Anoka......	Station No. 5, opposite Champlin Flour Mill.....	Middle of river...........	Mississippi River..
12485	6- 4-12	Anoka......	"	"	"
12494	6-11-12	Anoka......	"	"	"
12516	6-18-12	Anoka......	"	"	"
12539	6-25-12	Anoka......	"	"	"
					Average......
12447	5-24-12	Coon Rapids.	Station No. 6, head of Coon Islands.................	Middle of stream..........	Mississippi River..
12497	6-11-12	Coon Rapids.	"	"	"
12519	6-18-12	Coon Rapids.	"	"	"
12542	6-25-12	Coon Rapids.	"	"	"
					Average......
12448	5-24-12	Coon Rapids.	Station No. 7, below Coon Islands.................	Middle of stream..........	Mississippi River..
12486	6- 4-12	Coon Rapids.	"	"	"
12498	6-11-12	Coon Rapids.	"	"	"
12520	6-18-12	Coon Rapids.	"	"	"
12543	6-25-12	Coon Rapids.	"	"	"
					Average......

No. XIII

SPECIAL WATER EXAMINATIONS

Turbidity	Color	Odor 20°C	Total Hardness	Alkalinity	Incrustants	Ammonia		Nitrites	Nitrates	Chlorine	Iron	Bacteria Per	B. coli					
						Alb.	Free						1/1000 c.c.	1/100 c.c.	1/10c.c.	1 c.c.	10 c.c.	100 c.c.
3	107	V-2	108	112	0	0.498	0.134	0	0.120	1.3	0.4	2,500	....	....	0	+	....	+
3	138	V-3	110	120	0	0.760	0.054	Tr.	0.120	0.8	0.6	1,150	....	....	+	+	....	+
2	86	V-2	133	140	0	0.448	0.064	0	0.080	1.5	0.4	1,000	....	....	0	+	....	+
3	70	V-2	168	148	20	0.416	0.116	0	0	1.3	0.4	650	....	....	+	+	....	+
3	61	V-1	130	148	0	0.384	0.112	0	Tr.	1.3	Tr.	700	....	....	0	+	....	+
3.2	92.4	V-2	129.8	133.6	4	0.501	0.096	0	0.065	1.23	0.36	1,200	.... 6.4					
5	100	V-2	109	112	0	0.556	0.112	0	Tr.	1.3	0.2	2,200	....	....	0	+	....	+
3	134	V-3	110	120	0	0.602	0.050	Tr.	0.040	1.3	0.6	1,300	....	....	0	+	....	+
2	95	V-2	135	140	0	0.484	0.128	0	0.120	1.3	0.4	1,350	....	....	0	+	....	+
3	70	V-2	170	152	18	0.400	0.176	0	0	1.3	0.4	550	....	....	0	+	....	+
3	58	V-1	130	148	0	0.388	0.108	0	0	1.8	0	700	....	....	+	+	....	+
3.2	91.8	V-2	130.8	134.4	3.6	0.486	0.115	0	0.032	1.4	0.3	1,220	.... 0.82					
4	104	V-2	110	114	0	0.408	0.012	0	Tr.	1.25	0.2	3,300	....	....	0	+	....	+
3	125	V-2	113	120	0	0.620	0.056	Tr.	0.120	1.3	0.6	1,400	....	....	0	+	....	+
2	95	V-1	133	140	0	0.468	0.112	0	0.080	1.5	0.6	2,200	....	....	0	+	....	+
3	70	V-2	168	148	20	0.368	0.040	0	0	1.8	0.4	2,400	....	....	+	+	+	+
3	63	V-1	130	148	0	0.404	0.140	0	Tr.	1.3	0	700	....	....	0	+	....	+
3	92	V-1.6	130	134	4	0.453	0.072	0	0.040	1.4	0.4	2,000	.... 0.82					
7	86	V-2	115	120	0	0.358	0.082	0	0.040	0.7	Tr.	2,000	....	....	+	+	....	....
5	86	V-2	115	124	0	0.412	0.080	0	Tr.	1.3	0.2	1,100	....	....	....	+	....	....
3	106	V-1	125	132	0	0.500	0.048	0	Tr.	1.0	Tr.	1,100	....	....	....	+	+	....
3	75	V-2	138	138	0	0.384	0.072	0	0	1.8	Tr.	850	....	....	....	....	+	....
3	67	V-1	110	136	0	0.360	0.108	0	0.120	0.8	0	900	....	....	....	....	+	...
4.2	84	V-1.6	120	130	0	0.403	0.066	0	0.032	1.12	0.04	1,390	.... 4.42					
5	97	V-2	115	120	0	0.334	0.094	0	Tr.	1.0	0.2	2,000	....	....	....	+	....	....
5	86	V-2	113	128	0	0.438	0.046	0	Tr.	1.5	0.3	1,100	....	....	....	+	....	....
2	95	V-2	130	136	0	0.408	0.072	0	Tr.	1.0	0.2	2,000	....	....	....	+	....	....
3	70	V-2	140	134	6	0.392	0.036	0	0	1.3	0.4	2,200	....	....	....	....	+	....
2	67	V-1	118	136	0	0.376	0.088	0	0.040	0.8	0	1,200	....	....	.	+	...	....
3.4	83	V-2	123	131	1.2	0.390	0.067	0	0.008	1.3	0.22	1,700	.... 2.8					
......	......	......	......	......	......	......	......	....	......	......	.	2,800	...	...	+	...	...	...
5	95	V-2	148	148	0	0.456	0.056	0	Tr.	1.3	Tr.	1,200	...	...	....	....	+	....
3	75	V-2	140	138	2	0.416	0.020	0	0	1.3	0	600	...	...	....	....	+	....
3	65	V-1	123	148	0	0.400	0.132	0	0.080	1.8	0	1,500	...	...	....	+	...	....
3	78	V-2	137	145	0.7	0.424	0.016	0	0.027	1.5	Tr.	1,525	.... 4.22					
5	97	V-1	115	120	0	0.408	0.124	0	Tr.	1.0	0.2	3,000	...	...	....	...	+	....
3	82	V-2	120	132	0	0.446	0.036	0	Tr.	1.3	0.2	900	...	...	....	+	....	....
......	......	......	......	......	....	......	......	....	......	......	.....	1,400	...	...	....	+	...	....
......	......	......	......	......	....	......	......	....	......	......	.....	650	...	...	....	+	...	....
......	......	......	......	......	....	......	......	....	......	......	..	550	...	...	....	+	...	....
4	90	V-1.5	117	126	0	0.427	0.060	0	Tr.	1.2	0.2	1,300	.... 2.8					

TABLE No. XIII

SHOWING ANALYTICAL DATA ON SPECIAL

Lab. No.	Date Collect	City or Town	Map Location	Specific Location	Source
12450	5-24-12	Fridley	Station No. 8, opp. station	Middle of stream	Mississippi River
12487	6- 1-12	Fridley	"	"	"
12499	6-11-12	Fridley	"	"	"
12521	6-18-12	Fridley	"	"	"
12544	6-25-12	Fridley	"	"	"
					Average
12451	5-25-12	Minneapolis	Station No. 9, new pumping station	Over intake	Mississippi River
12488	6- 4-12	Minneapolis	"	"	"
12500	6-11-12	Minneapolis	"	"	"
12522	6-18-12	Minneapolis	"	"	"
12545	6-25-12	Minneapolis	"	"	"
					Average
12514	6-18-12	Anoka	Substation A, sewage purification plant	Outlet into Rum River	Sewage effluent
12537	6-25-12	Anoka	"	"	"
12496	6-11-12	Champlin	Substation B, Champlin Flour Mill	200 ft. from outlet	Elm Creek
12518	6-18-12	Champlin	"	"	"
12541	6-25-12	Champlin	"	"	"
12546	7- 3-12	Coon Creek	Substation C, mouth of Coon Creek	100 ft. from mouth	Coon Creek
12547	7- 3-12	Fridley	Substation D, Rice Creek	100 ft. from mouth	Rice Creek

—**Continued**

WATER EXAMINATIONS—Continued

Turbidity	Color	Odor 20°C	Total Hardness	Alkalinity	Incrustants	Ammonia		Nitrites	Nitrates	Chlorine	Iron	Bacteria Per	B coli					
						Alb.	Free						1/1000 c.c.	1/100 c.c.	1/10 c.c.	1/10 c.c.	10 c.c.	100 c.c.
5	86	V-1	120	124	0	0.116	0.134	0	Tr.	1.0	0.2	3,700	..	.	..	+	..	....
3	82	V-2	120	132	0	0.446	0.046	0	Tr.	1.3	0.2	1,300	....	.	0	0	+	+
4	86	V-2	143	146	0	0.524	0.048	0	0.040	1.3	Tr.	1,300	....	..	+	+	+	+
3	75	V-2	143	150	0	0.432	0.040	0	0.080	1.3	Tr.	500	...	...	0	+	+	+
3	65	V-1	128	141	0	0.400	0.100	0	0.010	0.8	0	2,000	....	..	0	+	+	+
3.6	79	V-1 6	131	139	0	0.444	0.074	0	0.032	1.14	0.06	1,760	....			2.62		....
5	86	V-1	132	132	0	0.386	0.146	0	0.120	1.3	0.1	2,500	...	...	.	+	...	....
5	86	V-2	123	136	0	0.410	0.066	0	Tr.	1.3	0.2	1,400	....	...	...	+	...	....
5	73	V-2	143	146	0	0.444	0.100	0	Tr.	1.0	Tr.	1,800	...	....	...	+	...	....
3	75	V-2	143	154	0	0.408	0.024	0	0.080	1.3	0	1,100	....	...	..	+	..	....
3	65	V-1	128	144	0	0.436	0.116	0	0.010	1.8	0	600	....	....	...	+	...	....
4.2	77	V-1 6	131	140	0	0.437	0.090	0	0.040	1.33	0.12	1,480	....			1.00		....
....	...	...				...	....			....	.....	4,600,000	+	+	+	+	+	+
...	.	...								...	.	78,000	+	+	+	+	+	+
...										...	...	2,200	...	..	0	0	0	+
..	...									..	.	1,300	....	...	+	+	+	+
...	..									..	....	3,800	..	..	0	+	+	+
...	..										..	5,400	..	...	+	+	+	+
...	.											2,800	.	.	+	+	+	+

LABORATORY DIVISION MINNESOTA

TABLE XIV SHOWING DISTRIBUTION OF

	DIPHTHERIA																	
	Aug. 1, 1910, to Aug. 1, 1911									Aug. 1, 1911, to Aug. 1, 1912								
	Examinations				Cases					Examinations				Cases				
	+	−	R	Total	Patients	Physicians	Release Negatives 0	1	2	+	−	R	Total	Patients	Physicians	Release Negatives 0	1	2
Ada		3	1	4	2	2					4	2	6	3	2			
Adams			1	1	1	1												
Adrian	10	30		40	15	1	2	3		7	8	1	16		1	1	1	2
Aitkin	13	10	6	29	4	2			1	22	14	2	38	8	3	3		2
Akeley		5	2	7	4	3				22	5	4	31	6	3	2		
Albany		5		5	3	1					12		12	6	1			
Albert Lea	13	129	17	159	104	6			11	2	1	8	11	4	2	1		
Alden		4		4	2	2												
Alexandria		7		7	4	3				11	6	10	27	12	3	5		
Altura											1		1	1	1			
Amboy	8	20	3	31	12	2	2	1	1									
Annandale	42	45	4	91	32	2	4	13	2	47	76	10	133	36	2		7	
Anoka	1	2		3	3	2	1			12	4		16	10	2	8		
Appleton	15	44	4	63	16	2	3		4									
Argyle											2		2	1	1			
Arlington										6	2	2	10	2	1	1	1	
Ashby		2	2	4	2	1					1		1	1	1			
Atwater		2		2	1	1					4		4	2	1			
Audubon											2	1	3	2	1			
Aurora																		
Austin	38	70	7	115	32	5	1	1	4	48	65	10	123	26	5	2		7
Badger																		
Bagley	1	1		2	2	2	1			12	4		16	3	1		1	
Balaton										2	6	2	10	2	1			1
Barnesville	1			1	1	1	1				3		3	2	1			
Barrett		6		6	3	1					4		4	2	1			
Battle Lake	1	1		2	2	1	1			2	1		3	2	1	1		
Baudette																		
Beaulien											3		3	1	1			
Becker	65	157	23	245	67	1	1	3	11		1		1	1	1			
Belle Plaine	36	42	8	86	17	1	1		6	12	9		21	4	1	1		1
Bellingham																		
Belview	3	9		12	3	1			2									
Bemidji										1	3	2	6	4	1	1		
Benson	17	34	2	53	16	3		4	1	22	19	1	42	10	2	1	3	
Bertha	5	20		25	7	1			2									
Bethel											4		4	2	1			
Big Falls			6	6	1	1												
Big Lake		2		2	2	1												
Bird Island		2	3	5	2	1						3	3	1	1			
Blackduck																		
Blooming Prairie		2		2	2	1					2		2	2	2			
Bloomington										1	1		2	1	1		1	
Blue Earth	1	1	2	4	3	1	1					1	1	1	1			
Bovey																		
Boyd	1	2		3	2	1	1				4		4	1	1			
Braham	2	6		8	4	1	1				5	1	6	5	1			
Brainerd	20	20	2	42	17	7	8				12	3	15	8	4			
Brandon											6	1	7	3	1			
Brewster		2		2	1	1						1	1	1	1			
Bricelyn	10	11		21	9	2	2				1	1	2	2	1			
Brooks	6	8	5	19	6	1	2			4		1	5	3	1	3		
Brooten		2		2	1	1												
Browerville	2	8		10	2	1	1			13	14	6	33	3	1			1
Brownsdale		1		1	1	1					2	2	4	2	1			
Browns Valley																		
Brownton										2			2	1	1	1		
Bruno											2	1	3	2	1			
Buffalo	14	16	1	31	5	2			3	16	8	3	27	5	2	1		
Buffalo Lake																		
Butterfield	6	1		7	4	1	3				6	2	8	2	1			
Byron	2	16	2	20	2	1			1	4	44	2	50	11	1			2

STATE BOARD OF HEALTH.

WORK DONE BY MAIN LABORATORIES

TYPHOID												SPUTUMS FOR B TUBERCULOSIS												Rabies Cases		Pasteur Cases	
Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12						Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12									
Examinations				Cases		Examinations				Cases		Examinations				Cases		Examinations				Cases					
+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	Aug '10 to Aug '11	Aug '11 to Aug '12	Aug '10 to Aug '11	Aug '11 to Aug '12
												3	9		12	11	2	2	9		11	11	5				
3			3	3	1	2	2		4	3	1								2		2	2	2				
2	1		3	2	1	5	2		7	7	2	6	12		18	17	2	5	6		11	6	2				
1			1	1	1		1		1	1	1		1		1	1	1		2		2	2	1				
	5		5	5	1	3	6		9	8	1	1	15	1	17	14	1	5	7		12	12	1				
							2		2	2	1		1		1	1	1	1	1		2	2	1				
							2		2	2	1	1	4		5	2	2	1	2		3	3	1				
													1		1	1	1										
						2	1	1	4	5	2							1	3		4	3	1				
9	9	1	19	19	1	2	13		15	17	2	6	9		15	15	1	5	2		7	6	1		2		1
													2		2	2	1		1		1	1	1	1			
2	1		3	3	1	3	9	1	13	10	2	1			1	1	1										
						2	3		5	7	1		1		1	1	1	1	12		13	10	2				
3			3	3	1		2		2	2	1								3		3	3	1				
							1		1	1	1													1			
																		1			1	1	1				
																		1			1	1	1		1		1
5	6		11	11	4	2	4	1	7	7	2	5	16		17	14	3	3	9		12	12	2				
												2	1		3	3	1										
	1		1	1	1	1	3	1	5	5	1																
1	1	1	3	3	1																						
												3	5		8	7	1	5	7		12	10	1				
1			1	1	1																						
	1		1	1	1							1			1	1	1		1		1	1	1				
	1		1	1	1	2			2	2	1		3	3	6	5	2										
5	4	1	10	9	1	3	2		5	5	1							3	1		4	4	2				
													3		3	3	1		1		1	1	1				
1	2		3	3	1	10	23	4	37	35	2		1		1	1	1										
	7	1	8	7	3		3		3	3	1	3	7		10	10	2	2	9		11	11	2				
																			1		1	1	1			3	
													1		1	1	1										
3	1		4	4	1							3	9		12	11	2	2	1		3	3	1				
						2	8		10	10	2																
		3	3	2	1														3	1	4	4	1				
																								1	4		2
1	1		2	2	1							3	2		5	5	1			1	1	1	1				
																		2	2		4	4	1				
							2	1	3	2	1								1		1	1	1				
						1	2		3	3	1	8	9		17	17	1	3	12		15	14	1				
1	4		5	5	1	8	11		19	16	2	2	5		7	5	2		6		6	5	2				
																			1		1	1	1				
7	7		14	11	2	7	7	2	16	14	2		3		3	1	1	3	5		8	6	1				
																			2		2	2	1				
	2		2	2	1							3	2		5	5	1		1		1	1	1				
						1	5		6	6	2																
2	10	1	13	12	3		3		3	3	3	1	7		8	6	2	1	6		7	7	2				
													2		2	2	1										
						1	4		5	5	1	1			1	1	1	1	3		4	3	1				
1	1		2	2	1																						

LABORATORY DIVISION MINNESOTA

TABLE XIV—SHOWING DISTRIBUTION OF

	DIPHTHERIA																	
	Aug. 1, 1910, to Aug. 1, 1911									Aug. 1, 1911, to Aug. 1, 1912								
	Examinations				Cases					Examinations				Cases				
	+	−	R	Total	Patients	Physicians	Release Negatives 0	1	2	+	−	R	Total	Patients	Physicians	Release Negatives 0	1	2
Cairo Township	114	356	46	516	157	3	13	5	13									
Caledonia		6	3	9	5	2				2	4	2	8	2	1	1		
Callaway																		
Calumet																		
Cambridge	4	4	1	9	2	1			1	4	22	7	33	15	3	2		
Campbell	2	6		8	4	1	1				2		2	1	1			
Camp Lake View																		
Camby		4	2	6	3	1					4		4	2	1			
Cannon Falls	2			2	2	1	2					4	4	2	2			
Canton			2	2	1	1				30	10	4	44	3	1		1	1
Carlos		8	2	10	7	1												
Carlton																		
Cass Lake	34	34	4	72	11	2	2	3	5									
Center City		8		8	3	1												
Ceylon										20	100	4	124	27	1		1	3
Chaska	2			2	2	1	2			2			2	1	1	1		
Chatfield	1	2		3	3	1		1			4		4	2	1			
Chisago City																		
Chokio											2		2	1	1			
Clara City											4	3	7	4	2			
Claremount																		
Clarkfield		1		1	1	1					1		1	1	1			
Clearwater		1		1	1	1					2		2	1	1			
Climax		1		1	1	1					2	4	6	3	1			
Clinton																		
Clitherall																		
Cohasset	4	5		9	3	2			1									
Cokato	2	3	2	7	5	1	1				7		7	4	1			
Cold Spring			1	1	1	1												
Coleraine		5		5	2	1												
Comfrey		2		2	1	1					4		4	1	1			
Comstock			1	1	1	1												
Cottonwood		1	2	3	3	1												
Crosby																		
Crookston																		
Currie																		
Cuyuna																		
Cyrus		4		4	2	1					3		3	2	1			
Dalton		5	1	6	3	1				2			2	1	1	1		
Dassel	5	11	3	19	12	1	3				3		3	2	1			
Dawson												1	1	1	1			
Dayton	8	18	1	27	12	1	2			19	5	18	42	13	2	4		
Deep Haven																		
Deer River	2	1		3	2	2	1											
Deerwood	18	23	1	42	18	1	1	6										
Delano		2		2	2	2				9	6		15	3	2		1	
Delavan										1	1	4	6	1	1	1		
Detroit	6	18	4	28	17	4	3	1		4	11	9	24	12	3	2		
Dexter	4			4	2	1	2											
Dilworth		1		1	1	1												
Dodge Center		1		1	1	1												
Donelly		2		2	1	1												
Duluth																		
Dumont																		
Dunnell																		
Eagan Township																		
Eagle Bend																		
Easton	2	4		6	3	1	1			6	8		14	6	1	2	1	
Echo	20	22	2	44	6	1			3	66	56	3	125	15	1		2	8
Eden Valley																		

STATE BOARD OF HEALTH—Continued

WORK DONE BY MAIN LABORATORIES

TYPHOID												SPUTUMS FOR B. TUBERCULOSIS												Rabies Cases		Pasteur Cases	
Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12						Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12									
Examinations				Cases		Examinations				Cases		Examinations				Cases		Examinations				Cases					
+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	Aug '10 to Aug '11	Aug '11 to Aug '12	Aug '10 to Aug '11	Aug '11 to Aug '12
												1			1	1	1	1	3		4	4	2		1		
1	1		2	2	1	2	1	1	1	1															1		
																			1		1	1	1				
	1		1	1	1							3	10		13	11	1	2	7		9	9	2				
2	4		6	6	1	1	1		2	2	1		1		1	1	1										
																			1		1	1	1				
												1	7		8	8	2		6		6	6	1				
2	5		7	5	2							1	2		3	5	1	2	5		7	7	1				
1	1		2	2	1		3		3	5	1	3	13		16	15	1	2	7		9	8	1				
								1	1	1	1														1		
																			4		4	3	1				
	1		1	1	1													1	6		7	6	2		1		
						1	1		2	2	1																
1	3		4	4	1	7	3	4	15	12	1		8		8	8	1	2	10		12	10	1				
												2	4		6	6	1		2		2	2	1				
																			1		1	1	1				
													1		1	1	1										
5	10		15	13	12	1			1	1	1	1			1	1	1	2	7		9	9	1				
1	5		6	6	2								6		6	4	2	1	6		7	7	1				
2			2	2	1		1	1	2	2	1																
35	8	2	45	40	2																						
													1		1	1	1	1			1	1	1				
													1		1	1	1		1		1	1	1				
2	6		8	6	3	3	5	1	9	8	2		8		8	8	2	1	4		5	5	2				
													1		1	1	1										
													1		1	1	1										
													2		2	2	1	1	3		1	4	1				
3	6	1	10	9	1	1	3		4	3	1	1	6		7	5	1		1		1	1	1				
												1	6		7	5	1		1		1	1	1				
												1	2		3	3	1	1	8		9	8	1		1		1
2	14	1	17	13	12	1	9		10	9	3		2		2	2	1		5		5	4	1				
																								2		7	
																			1		1	1	1				
6	7		13	8	1								4		4	3	2		1		1	1	1				
						1	1		2	2	1	1	3		4	4	1	1	3		4	4	1				
	1	1	2	1	1	1			1	1	1																
3	7	1	11	9	3	2	11	2	15	12	2	2	6		8	7	2	5	15		20	20	3				
													2		2	1	1										
1			1	1	1		2		2	1	1																
																									1		
																								1			
																		1			1	1	1				
																									2		
1	4		5	3	1							6	9		15	11	2	4	7		11	10	2				
													2		2	2	1										

LABORATORY DIVISION MINNESOTA

TABLE XIV—SHOWING DISTRIBUTION OF

DIPHTHERIA

	Aug. 1, 1910, to Aug. 1, 1911									Aug. 1, 1911, to Aug. 1, 1912								
	Examinations				Cases					Examinations				Cases				
							Release Negatives									Release Negatives		
	+	−	R	To-tal	Patients	Physicians	0	1	2	+	−	R	To-tal	Patients	Physicians	0	1	2
Edgerton											5		5	1	1			
Edina																		
Elbow Lake	1	7	1	9	7	1			1	66	83	24	173	49	1	3	6	
Elgin	2	13	1	16	4	1		1		10			10	2	1	2		
Elk River	3	14	1	18	11	2	3			35	24	12	71	15	2	2	7	
Ellendale																		
Ellsworth										6	2		8	4	1	3		
Elmore	1	2		3	2	1		1										
Ely																		
Elysian																		
Emmons		2		2	1	1						3	3	2	1			
Erskine	4	2		6	3	1	2			2	2	4	8	2	1	1		
Euclid																		
Evansville																		
Eveleth																		
Excelsior	26	29	4	59	16	1	1	2	1	2	10	2	14	6	2		1	
Eyota	3	2		5	1	1		1		2		2	4	1	1	1		
Fairfax	11	20	4	35	4	2	2				8	1	9	5	1			
Fairmont										2	2		4	2	1	1		
Faribault	51	36	17	104	27	6	4	7	3	13	18	5	36	10	2	1	2	1
Farmington	14	17	2	33	10	2	3											
Fergus Falls	25	28	11	64	18	2	5	1	2	81	63	80	224	88	4	5	18	
Fertile		1		1	1	1				2	9	3	14	8	2	1		
Finlayson																		
Fisher																		
Foley	20	28		48	9	2	2	5			4		4	1	1			
Forest Lake										30	4		34	4	1	3		1
Fort Snelling		6	1	7	6	4												
Fosston	1	1		2	2	1					2	1	3	1	1			
Franklin										14	2	2	18	4	1	2		
Frazee		2	2	4	2	1				2	8	6	16	2	2	1		
Freeborn																		
Freeport		6	4	10	3	1												
Fridley																		
Frost																		
Fulda	2	1		3	1	1		1		28	26	7	61	10	2		5	3
Gary		2	1	3	3													
Gaylord			1	1	1	1				7	4		11	1	1			1
Gibbon	12	37	8	57	17	2	1		4	18	14	6	38	8	2	2	2	
Gilbert																		
Gladiola																		
Glencoe	9	14	11	34	18	2	6	1				1	1	1	1			
Glenwood		2	3	5	4	1				2	2	4	8	2	1	1		
Glenville		3		3	1	1						1	1	1	1			
Glydon		3		3	3	1					6	3	9	4	1			
Goodhue		16		16	9	2					22		22	10	2			
Good Thunder		8		8	5	1												
Graceville	1			1	1	1	1			14	4	6	24	7	1	4	2	
Granada		2	1	3	1	1				4	8	2	14	5	2		2	
Grand Meadow	1			1	1	1	1			2	28	2	32	8	1		1	
Grand Rapids		20		20	9	2					4	2	6	3	2			
Granger																		
Granite Falls	91	80	24	195	35	2	2	3	10		12	8	20	9	3			
Grant Township																		
Greenbush																		
Green Isle	2	13	2	17	5	1	1			1	12	7	20	10	1	1		
Grygla											2		2	1	1			
Grove City		1		1	1	1												
Gully	3	34	5	42	31	1	1	1			13	1	14	7	1			
Hallock	4			4	2	1	1			82	368	23	473	340	2	13	15	1
Halstad																		
Hamel		1	1	1	1													

STATE BOARD OF HEALTH—Continued

WORK DONE BY MAIN LABORATORIES

TYPHOID												SPUTUMS FOR B. TUBERCULOSIS												Rabies Cases		Pasteur Cases	
Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12						Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12									
Examinations				Cases		Examinations				Cases		Examinations				Cases		Examinations				Cases					
+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	Aug '10 to Aug '11	Aug '11 to Aug '12	Aug '10 to Aug '11	Aug '11 to Aug '12
1	7	1	9	7	2	1	2	2	5	4	1		4		4	4	1										
																									2		
6	16	1	23	13	2	1	8	1	10	8	1	1	3		4	4	2										
1	2		3	3	1	1	3		4	2	1	4	7		11	11	1	3	5		8	6	1				
						1			1	1	1																
						4	5		9	7	1																
													2		2	2	1										
5	18	1	24	15	2	3		3	6	6	1																
																			2		2	2	1				
1			1	1	1							1	2		3	2	1		1		1	1	1				
2	3	1	6	5	1		1		1	1	1		1		1	1	1		4		4	4	1				
1	2		3	3	1																						
												2	5		7	7	1	2			2	2	1				
	1		1	1	1																				1		
3	2	1	6	2	1	1			1	1	1													1	1	2	5
	6		6	5	2		1		1	1	1	2	8		10	9	1										
	4	1	2	1	1		1		1	1	1	1	1		2	2	1	3	3		6	6	1				
6	6	1	13	10	4	3	7	1	11	10	5	2	3		5	5	2	3	3		6	6	1				
1			1	1	1	1	2		3	3	1		3		3	2	1		1		1	1	1		2		2
48	28	4	80	70	4	9	26	4	39	34	3		5		5	5	2		1		1	1	1				
								1	1	1	1								2		2	2	1				
	1		1	1	1																						
	2	1	3	3	1																						
1	4	1	6	6	1			1	1	1	1		1		1	1	1	1	1		2	2	1		1		
	4		4	4	2	1	1		2	2	1														1	1	1
							1		1	1	1		4		4	4	1	2			2	1	1				
1	1		2	2	2	2	4	1	7	7	2		4		4	3	1	3	6		9	8	1				
																			2		2	1	1				
	1	1	2	2	1		1		1	1	1													1			
							1		1	1	1													3	3	2	2
																										4	
							1		1	1	1																
						1			1	1	1	1	7		8	7	2	1			1	1	1				
													7		7	7	1	5	6		11	8	1				
																									2		
																									1		
2	2		4	4	2	3	3		6	6	2																
2	1		3	3	1		1		1	1	1		2		2	2	1										
1	1		2	2	1		4		4	4	1								4		4	4	1				
4	7		11	10	2	3	2		5	5	1																
																		1			1	1	1				
												1			1	1	1		1		1	1	1				
																	1				1	1	1				
													3		3	1	1										
8	8		16	15	2	5	6		11	11	3		1		1	1	1	1			1	1	1				
																									2		4
1	2		3	3	1	3	17		20	17	3	1	12		13	13	2	6			6	6	2				
																									1		1
												4	6		10	10	1	3	12		15	14	2				
	2		2	2	1	1		1	2	2	1		1		1	1	1	1	7		8	8	1				
																			3		3	3	1				
1	1		2	2	1	1	1	2	4	3	1																
	2	1	3	2	1													1	8		9	7	1				
1	6		7	7	2	1	6		7	7	1																
																			3		3	3	1				

LABORATORY DIVISION MINNESOTA

TABLE XIV—SHOWING DISTRIBUTION OF

	DIPHTHERIA																	
	Aug. 1, 1910, to Aug. 1, 1911									Aug. 1, 1911, to Aug. 1, 1912								
	Examinations				Cases					Examinations				Cases				
							Release Negatives									Release Negatives		
	+	−	R	Total	Patients	Physicians	0	1	2	+	−	R	Total	Patients	Physicians	0	1	2
Hampton	4	2		6	2	1		1			2	1	3	1	1			
Hancock	4	2		6	1	1		1										
Hanley Falls	2	6		8	3	2		1										
Hanover	5	8		13	2	1		1	1	1	8	5	14	3	2		2	
Hanska		4		4	2	1					2		2	1	1			
Hardwick										9			9	2	1	2		
Harris																		
Harmony	118	67	28	213	20	2	4	2	11	22	22	4	48	6	1	1		2
Hartland		1	2	3	1	1					2		2	1	1			
Hastings	19	13	1	33	9	3	1	3		167	80	18	265	49	4	5	22	
Hawley	1	5		6	3	2		1				1	1	1	1			
Hayfield		3		3	2	1				22	14	2	38	4	1	1	1	2
Hector																		
Henderson		1		1	1	1						2	2	1	1			
Hendricks																		
Hendrum																		
Henning	2	22		24	7	1	1				4		4	1	1			
Heron Lake	4	3		7	7	2	4			8	22	12	42	15	1	1	1	
Hewitt											2		2	1	1			
Hills																		
Hinckley																		
Hoffman		2	2	4	2	1				16	8	4	28	8	1	5	1	
Hokah		2	1	3	2	1												
Holdingford																		
Holland																		
Holloway																		
Hopkins	27	25	10	62	27	2	9	1		4	14	6	24	10	2	1	1	
Houston	1	3	1	5	5	1	1			2	6		8	4	1	1		
Howard Lake																		
Hugo											16	10	26	7	1			
Hutchinson	16	41	6	63	26	2	2	2	2	22	44	2	68	14	2	1	1	4
International Falls										8	8		16	5	1	1	1	
Inver Grove Township																		
Irondale																		
Iron Junction																		
Isanti	4	1		5	3	1	2			4	2	2	8	4	1	2		
Jackson			3	3	2	1				2	2	1	5	2	1		1	
Jacobson											2		2	1	1			
Janesville										6		2	8	4	1	3		
Jasper		2		2	1	1												
Jeffers	68	50	6	124	30	1	4	13		2			2	1	1	1		
Jordan	1	1		2	2	1	1			6		5	11	3	1	1		
Karlstad																		
Kasota																		
Kasson		2	4	6	2	1												
Kellogg	34	37	19	90	8	1		1	4	4	18	2	24	7	1			1
Kensington										26	12	6	44	4	1	1	1	2
Kent	1			1	1	1	1											
Kenyon	3	1	4	8	5	2	2			8	6	2	16	6	2	3		
Kerkhoven																		
Kiester	14	2	1	17	2	1		1										
Kilkenny																		
Kimball	28	56	4	88	27	2	4		5		14		14	4	1			
Lafayette	16	25	2	43	8	1	1	1	4									
Lake Benton																		
Lake City	86	70	16	172	32	3	1	12	6	9	6	6	21	6	1		2	
Lake Crystal																		
Lake Elmo		1		1	1													
Lake Park		1		1	1	1				4			4	1	1	1		
Lakeville	4	3		7	1	1	2			2	4	8	14	3	1		1	
Lake Wilson		4		4	2	1					2		2	1	1			

STATE BOARD OF HEALTH—Continued

WORK DONE BY MAIN LABORATORIES

TYPHOID												SPUTUMS FOR B. TUBERCULOSIS												Rabies Cases		Pasteur Cases	
Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12						Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12									
Examinations				Cases		Examinations				Cases		Examinations				Cases		Examinations				Cases					
+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	Aug '10 to Aug '11	Aug '11 to Aug '12	Aug '10 to Aug '11	Aug '11 to Aug '12
													3		3	3	1		1		1	1	1				
													4		4	4	1										
						1	1		2	1	1		12		12	9	1	1	14		15	13	1				
													2		2	1	1			1	1	1	1				
								1	1	1	1																
							2		2	2	1							3	1		4	4	1				
																								1		1	1
																		1			1	1	1				
																			1		1	1	1				
													9		9	8	3		5	1	6	6	1				
												3			3	1	1	2	3		5	3	1				
												2	5		7	7	2										
2	1		3	3	1	4	2		6	5	2	6	6		12	9	1	9	12		21	14	1				
2	6		8	7	3		1	1	2	2	1							1			1	1	1				
1	4		5	5	1		2		2	2	1		4		4	4	1		8		8	8	1				
												1	4		5	4	1										
																			1		1	1	1				
												1	2		3	3	1		1		1	1	1				
	1		1	1	1								2		2	2	1										
													1		1	1	1								1		
6	3		9	7	2			1	1	1	1	1	10		11	9	1		5		5	5	1	2	3	6	4
												1			1	1	1										
												1	3		4	4	1		3		3	1	1				
2	5		7	5	1	1			1	1	1		3		3	3	1		1		1	1	1				1
4	1		2	2	1		1		1	1	1																
																										1	2
																								1			
																								1			
													1		1	1	1	1			1	1	1				
																		2	2		4	4	1				
												1			1	1	1	2	1		3	2	1				
								1	1	1	1	1	7		8	6	1	1	9		10	10	2				
							1		1	1	1	2			2	1	1										
	1		1	1	1	1			1	1	1																
												2	1		3	1	1	3			3	2	1				
1		1	2	4	1																						
1	1		2	2	1	1	1		2	1	1																
	1		1	1	1								2		2	1	1		3		3	2	1				
																			2		2	2	1				
	1		1	1	1																						
	2		2	1	1		1	1	2	2	1		1		1	1	1	1	5		6	5	1				
												1	4		5	5	1	1	3		4	4	1				
1			1	1	1							2	3		5	4	2	2	9		11	8					
	1		1	1	1								3		3	2	1										
																			4		4	3	1				
7	10		17	15	2	2	3	2	7	6	2	4	4		8	8	2	4	9		13	9	2				
													1		1	1	1										
																									1		3
1			1	1	1														2		2	2	1		1		
2	4		6	5	1	1	1		2	2	1																
	4		4	2	1	4	2	1	7	5	1																

LABORATORY DIVISION MINNESOTA

TABLE XIV—SHOWING DISTRIBUTION OF

	DIPHTHERIA																		
	Aug. 1, 1910, to Aug. 1, 1911									Aug. 1, 1911, to Aug. 1, 1912									
	Examinations				Cases					Examinations				Cases					
	+	−	R	Total	Pattents	Physicians	Release Negatives 0	1	2	+	−	R	Total	Patients	Physicians	Release Negatives 0	1	2
Lambert												1	1	1	1			
Lamberton	11	6	3	20	7	1	4			2	2	1	5	3	1	1		
Lancaster											2		2	1	1			
Lanesboro	10	1	1	12	3	2	1				3		3	1	1			
Le Roy	2	1		3	1	1		1										
Le Sueur	2	10	2	14	5	2		1			2	1	3	1	1			
Le Sueur Center																		
Lester Prairie											1		1	1	1			
Lewiston	12	55	10	77	25	2		3	9	6	6		12	3	1	1		
Lindstrom		1		1	1	1					1		1	1	1			
Lismore																		
Litchfield	2	18	2	22	9	3	1			3	2		5	2	1	1		
Little Falls																		
Little Fork																		
Long Lake																		
Long Prairie	4	6		10	4	3		1		6	16		22	7	1			1
Lonsdale	11	4		15	10	1	10			2			2	2	1	2		
Lowry										6	20		26	4	1			2
Luverne	5	5		10	8	2	1			14	2	4	20	12	2	8		
Lyle		4	4	8	2	1				2	2		4	3	1	2		
McIntosh												1	1	1	1			
McKinley																		
Mabel										6	22	4	32	10	2	1	1	1
Madelia																		
Madison												1	1	1	1			
Mahnomen												1	1	1	1			
Mankato	50	85	10	145	35	8	3	1	5	4	13	12	29	9	3	1		
Mantorville	4	6		10	4	1		3										
Maple Lake										2	8	2	12	4	1		2	
Mapleton		2	1	3	3	1					1		1	1	1			
Marble																		
Marietta																		
Marine	25	12	1	38	3	1		1	2		2		2	1	1			
Marshall																		
Mayer	4	10		14	8	1					6	2	8	3	1			
Maynard	45	38	2	85	14	1	2	1	5		2		2	1	1			
Mazeppa	4	1	2	7	3	1	1				6	8	14	6	1	1		
Melrose	5	6		11	6	2	3			4	4		8	4	2	2		
Menahga											4	2	6	2	1			
Middle River		2		2	1	1												
Milaea	20	23	2	45	8	2		1	2	8	4	2	14	2	1			1
Milan	10	6		16	7	1	4				4	1	5	3	1			
Milroy										30	16	12	58	12	1	5	2	1
Minneapolis	172	525	80	777	370	17	13	3	4	637	1092	126	1855	391	32	15	1	20
Minneiska	9	13	2	24	11	1		4		2	3		5	2	2		1	
Minneota											2		2	1	1			
Minnesota Lake	3	5		8	4	1		2										
Minnetrista Township																		
Mitchell																		
Monterey										1	2	3	6	1	1		1	
Montevideo	12	18	2	32	7	2			2	14	12	6	32	6	4	1		
Monticello	3	10		13	6	2		2	1	19	6	6	31	8	1	1		
Montgomery	2	3		5	4	1	1											
Montrose		2		2	1	1					2		2	1	1			
Moorhead																		
Moose Lake																		
Mora																		
Morgan	4	3		7	3	1	1					1	1	1	1			
Morris		2		2	2	2				55	524	29	608	422	3	5	10	4
Morristown		1		1	1	1												

STATE BOARD OF HEALTH—Continued

WORK DONE BY MAIN LABORATORIES

TYPHOID												SPUTUMS FOR B. TUBERCULOSIS												Rabies Cases		Pasteur Cases	
Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12						Aug. 1, 10, to Aug. 1, 12						Aug. 1, 11, to Aug. 1, 12									
Examinations				Cases		Examinations				Cases		Examinations				Cases		Examinations				Cases		Aug '10 to Aug '11	Aug '11 to Aug '12	Aug '10 to Aug '11	Aug '11 to Aug '12
+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians				
6	2		8	6									5		5	5	1	1	5		6	5	2				
2			2	2	1	1			1	1	1	1			1	1	1										
							1		1	1	1																
	2		2	2	1							2	4		6	3	2	1	6		7	5	2				
												1	1		2	2	1		1	1	2	1	1				
	1		1	1	1	1	1		2	2	1																
	1		1	1	1	1	4		5	5	1		3		3	3	1										
							1	1	2	2	1																
																								1		1	
												3	2		5	5	1	1	1		2	2	1				
1			1	1	1	1	2		3	3	2	3	7		10	9	1	5	10		15	15	1				
							1		1	1	1		2		2	2	1	1	3		4	4	1				
2	4		6	4	1		3		3	3	1								10		10	6	1				
	3		3	3	1		4	1	5	5	2	5	11		16	11	1	5	10		15	13	1				
3	1		4	4	2	3	1	1	5	4	1	3	1		4	4	1		2		2	2	1				
6	21		27	26	2		6		6	5	1	3	18		21	17	2	5	10		15	15	2				
																									2		1
						1		4	5	4	1							1	1		2	2	1				
7	19		26	21	2	3	3	1	7	5	1		1		1	1	1		1		1	1	1				
												1	6		7	7	1		3		3	3	1		1		
14	19		33	31	8	10	13	3	26	21	9	3	16		19	17	4	2	6	1	9	9	3				
3	2	1	6	6	1	2	2		4	4	1																
23	25	4	52	43	1		1		1	1	1																
	7		7	7	1		6		6	4	1																
	5		5	5	1								1		1	1	1		1		1	1	1		1		
																			1		1	1	1				
						1	1		2	1	1	2	2		4	4	1										
1	4		5	5	3		4		4	4	1	1	10		11	10	2	4	3		7	7	1				
																			1		1	1	1				
2	3		5	5	2	3	4		7	5	2							1	3		4	4	2				
	2		2	2	1	2	3		5	5	1															1	
278	437	31	746	703	104	205	333	44	582	450	76	10	19	1	30	24	5	12	29		41	36	3	8	9	56	124
																		1	2		3	3	1				
						5	2	1	8	7	1		2		2	2	1		1		1	1	1				
	1		1	1	1														1		1	1	1				
																										1	
																											1
2	1		3	3	2	3	3		6	5	1							1			1	1	1			1	1
2	2		4	4	2		1		1	1	1																
																									1		
1	2	2	5	5	1		1		1	1	1	3	9		12	10	1	1	4		5	5	1			1	
																			5		5	4	1				
1			1	1	1							3	4		7	7	1	3	16		19	13	1				
9	11	2	22	18	2	1	8	2	11	11	2		1		1	1	1	3	7		10	10	2				
1	1		2	2	1	2	2	1	5	5	1	1	2		3	3	1										
													2		2	2	1	3	1		4	2	1			2	
												1	2		3	3	1										

LABORATORY DIVISION MINNESOTA

TABLE XIV—SHOWING DISTRIBUTION OF

	DIPHTHERIA																	
	Aug. 1, 1910, to Aug. 1, 1911									Aug. 1, 1911, to Aug. 1, 1912								
	Examinations				Cases					Examinations				Cases				
	+	−	R	Total	Patients	Physicians	Release Negatives			+	−	R	Total	Patients	Physicians	Release Negatives		
							1	1	2							0	1	2
Morton	2	2	2	6	1	1			1									
Mound		1		1	1	1				5	6	6	17	3	1	1		
Mountain Lake			1	1	1	1												
Murdock		1		1	1	1												
Nashwauk																		
New Brighton										7	3	6	16	8	1	4		
New Folden																		
New London	12	10		22	4	1	1	1	1									
New Market	1	4		5	3	1	1			6			6	2	1	2		
New Richland		2		2	1	1					3		3	2	1			
New Scandia Township																		
New Ulm		3		3	2	1				2			2	1	1	1		
New York Mills	3			3	1	1	1				1		1	1	1	1		
Neilville																		
North Branch	32	12		44	5	2			1		4		4	1	2			
Northfield	29	18	13	60	8	3	1	1	3	24	20	4	48	9	2	2	1	1
Northome																		
North St. Paul	30	14	2	46	7	1	2		2			2	2	1	1			
Norwood		2		2	2	2												
Ogema		6		6	3	1												
Ogilvie																		
Olivia	1	1		2	1	1		1		4			4	1	1	1		
Onamia	6	1	2	9	2	1	1											
Osakis	4			4	1	1	1			4	4	2	10	5	1	2		
Osseo																		
Ostrander		4		4	1	1												
Owatonna	13	35	1	49	20	3		3	2		8	8	16	7	3			
Parkers Prairie	13	25	6	44	9	1			6		2		2	1	1			
Park Rapids										14	22		36	8	1			3
Paynesville																		
Pelican Rapids	12	23	6	41	18	2	1	4		4	6		10	3	1		2	
Pequot	7		2	9	3	1	3											
Perham	1		1	2	2	1	1					1	1	1	1			
Pierz	5	10	2	17	8	1	2	1				3	3	2	1			
Pine City		5	1	6	4	1				43	51	6	100	23	2	2	9	
Pine Island	1			1	1	1	1	1		1	3	2	6	5	2	1		
Pine River	7	9	2	18	5	1	1		2									
Pipestone	6	14	1	21	6	2			1	24	7	3	34	7	2	4	1	
Plainview	6	12	4	22	10	2	3			60	401	56	517	361	3	8	8	7
Plummer																		
Plymouth Township																		
Preston																		
Princeton		8		8	3	1				2	8	5	15	7	1	1		
Prior Lake												1	1	1	1			
Randall																		
Raymond		1		1	1	1												
Red Lake Falls	18	9	6	33	6	2		2										
Red Wing	29	39	2	70	16	4	1		8	68	52	6	126	22	2	1	4	5
Redwood Falls		1		1	1	1					4		4	2	1			
Renville	11	2		13	3	2	1		1	26	6	4	36	6	1	4		
Richfield																		
Richmond																		
Robbinsdale																		
Rochester	197	212	79	488	101	4	17	12	15	141	343	53	537	296	8	13	21	2
Rockford											4	4	8	3	2			
Rose Township																		
Roseau	20	23	6	49	9	1	1	2	5	8	4		12	1	1	3		1
Rose Creek																		
Rosemount	6	10		16	5	1		2										
Rothsay												1	1	1	1			
Royalton	6	2	2	10	6	2	4					2	2	1	1			

STATE BOARD OF HEALTH—Continued

WORK DONE BY MAIN LABORATORIES

TYPHOID												SPUTUMS FOR B. TUBERCULOSIS												Rabies Cases		Pasteur Cases	
Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12						Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12									
Examinations				Cases		Examinations				Cases		Examinations				Cases		Examinations				Cases		Aug '10 to Aug '11	Aug '11 to Aug '12	Aug '10 to Aug '11	Aug '11 to Aug '12
+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians				
		1	1	1	1		1		1	1	1	1	2		3	3	1										
1			1	1	1																						
													1		1	1	1		1		1	1	1	1			
	1		1	1	1		1		1	1	1	1	1		2	2	1										
							2		2	2	1	1	3		4	4	1	2	6		8	7	1				
1			1	1	1	1	1		2	2	1		4		4	4	1		2		2	2	1				
																										1	
	1		1	1	1	1	5		6	6	2	6	25		31	30	2	9	15		24	21	3				
							1		1	1	1																
2		2	4	2	1																						
							2	1	3	3	2		1		1	1	1		2		2	2	1				
2	2		4	4	1	2	3	1	6	4	2	7	7		14	13	2	3	5		8	8	3				
							5		5	5	2								2		2	2	1				
													23		23	20	1		2		2	2	1		3		2
	1		1	1	1	1	3		4	2	1	2	5		7	7	1		1		1	1	1				
	1		1	1	1																						
						1			1	1	1																
													1		1	1	1	2	3		5	4	1				
																			4		1	3	1				
5	8	1	14	13	6	3	5	6	14	10	6	2	5		7	6	2	1	15		16	14	2				
	2		2	2	1								2		2	2	1		3		3	3	1				
																		1			1	1	1				
	3		3	2	1	2	4	1	7	7	3	1			1	1	1										
2	1		3	2	1	3	3		6	5	1	3	21		24	24	1	3			3	3	1				
												1			1	1	1										
	1	1	2	2	1		2	1	3	3	2														1		1
												1	2		3	3	1	1	2		3	3	1				
1			1	1	1		1		1	1	1		2		2	1	1	1	3		4	3	1				
							3		3	2	1																
							3		3	2	1																
2	3		5	5	1	1	4		5	4	1	1			1	1	1		1		1	1	1				
	3		3	2	1							1	3		4	4	1	1	4		5	5	1				
	2		2	2	1																						
																									1	1	
																		1	4		5	5	1				
5	9		14	14	1	6	10		16	16	1	1	4		5	5	1		22		22	18	1				
												1			1	1	1	4	3		7	6	1				
	1		1	1	1																						
																			2		2	2	1				
												1	2		3	3	1										
4	24	2	30	25	5	4	5	2	11	9	5		2		2	2	1	2	7		9	8	2				
	1		1	1	1	4	3		7	7	4																
																											1
							4		4	4	1							1	3		4	4	1				
	2		2	1	1								1		1	1	1										
5	28	2	35	34	11	20	60	6	86	77	16	5	10		15	11	1	4	11		15	14	1	1			
							1		1	1	1							1	3		4	4	1				
																								2	1	3	6
	3	1	4	4	1		1		1	1	1		4		4	4	1	1	3		4	4	1				
												1			1	1	1		1		1	1	1				
							1		1	1	1		1		1	1	1	3	3		6	5	1				

LABORATORY DIVISION MINNESOTA

TABLE XIV—SHOWING DISTRIBUTION OF

	DIPHTHERIA																	
	Aug. 1, 1910, to Aug. 1, 1911									Aug. 1, 1911, to Aug. 1, 1912								
	Examinations				Cases					Examinations				Cases				
							Release Negatives									Release Negatives		
	+	−	R	Total	Patients	Physicians	0	1	2	+	−	R	Total	Patients	Physicians	0	1	2
Rush City	8	7	2	17	4	2	1		2	4	6	2	12	5	1		1	
Rushford	9	14	2	25	6	3		1	1	16	22		38	8	2			3
Rushmore			2	2	1	1												
St. Anthony Park		14	1	15	14	1				180	1106	95	1381	490	2	17	2	25
St. Bonifacius																		
St. Charles	3	11	5	19	12	2		1	2		22	6	28	12	3		1	2
St. Clair		2		2	2	1					1		1	1	1			
St. Cloud	75	100	17	192	48	8	2	13	4	22	27	14	63	21	4	2	4	
St. Hilaire																		
St. James	2	6	2	10	3	2			1	2	1		3	1	1		1	
St. Louis Park	7	7	6	20	6	1	2	1			10	2	12	5	1			
St. Martin																		
St. Michael	16	6	2	24	4	1	1	2	1	2	2		4	1	1		1	
St. Paul	45	55	5	105	29	6	1	2		4	17	2	23	4	2	1		
St. Paul Park										15	5	3	23	5	1	2	1	
St. Peter	6	18		24	8	3	1	1		1027	2984	465	4476	1251	3	19	44	208
St. Vincent																		
Sacred Heart		2		2	1	1				8	10	2	20	5	1	2	1	
Sanborn			2	2	2	1												
Sandstone	2		2	4	2	2	1			29	16	20	65	11	2	3	3	1
Sauk Center	10	8		18	4	3	1	1										
Sauk Rapids	15	14		29	3	1			3									
Sebeka											4		4	2	1			
Sedan		3		3	1	1					2		2	1	1			
Shakopee	1			1	1	1	1			9	12		21	4	2			2
Shelly																		
Sherburn	3	2		5	3	1	2			7	1		8	1	1		1	
Silver Lake																		
Slayton		2		2	1	1												
Sleepy Eye	2	9	1	12	6	1	1			4	4		8	6	1	4		
South Haven											2		2	1	1			
South St. Paul	156	329	50	535	152	4	7	28	14	11	19	10	40	13	3	1	1	1
South Stillwater																		
Spicer		2		2	1	1												
Spring Grove		12	4	16	4	1				1	26	2	29	7	1			1
Spring Valley	4	6	4	14	5	2			1	22	22	3	47	7	2	1		2
Stanchfield												2	2	1	1			
Staples			1	1	1	1												
Stephen	37	40	9	86	14	1	1		8		8		8	3	1			
Stewart	4	8		12	5	3		2										
Stewartville										3	2		5	2	1		1	
Stillwater	59	35	6	100	21	8	1	6	2	66	49	7	122	26	8	4	5	2
Swanville		1		1	1	1												
Thief River Falls	5	11	2	18	9	4	2		1		3	1	4	4	2			
Tintah												2	2	1	1			
Tracy										8	7	2	17	7	1	1		
Traverse Township																		
Truman	2	6		8	5	1	1				8		8	5	1			
Twin Valley										4			4	2	1	2		
Two Harbors	58	999	50	1107	1013	2	Rel. by Dul Branch.											
Tyler	5	12		17	4	1			2									
Ulen																		
Verndale											2		2	1	1			
Vesta	16	15	6	37	10	1	1	3		2	6	1	9	4	1	1		
Virginia																		
Wabasha	184	242	10	436	74	4	12	16	31	26	40		66	15	4	4	1	4
Wabasso	4	3	17	24	10	2			2	11	28		39	12	1	1		
Waconia	2	2		4	3	2	2											
Wadena		3		3	2	2					4	2	6	3	2			
Walker	4	7	2	13	6	1	2			2	4	3	9	4	1	1		

STATE BOARD OF HEALTH—Continued

WORK DONE BY MAIN LABORATORIES

TYPHOID												SPUTUMS FOR B. TUBERCULOSIS												Rabies Cases		Pasteur Cases	
Aug. 1, 10, to Aug. 1, 11						Aug. 1, 11, to Aug. 1, 12						Aug. 1, 10, to Aug. 1, 12						Aug. 1, 11, to Aug. 1, 12									
Examinations				Cases		Examinations				Cases		Examinations				Cases		Examinations				Cases					
+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	+	−	R	Total	Patients	Physicians	Aug '10 to Aug '11	Aug '11 to Aug '12	Aug '10 to Aug '11	Aug '11 to Aug '12
6	6		12	12	2		3	4	7	5	1	3	10		13	13	1	3	7		10	10	1				
							3		3	2	1	2	12		14	11	1	5	16		21	20	2				
													2		2	2	1	1	5		6	3	1				
	2		2	1	1							2			2	2	1		2		2	2	1				
																			1		1	1	1		1		
1			1	1	1		5	2	7	7	2	2	12		14	12	2	7	19		26	25	3				
							1		1	1	1	1	2		3	2	1		2		2	2	1				
4	9	2	15	14	3		8		8	6	1	2	5		7	6	3	1	6		7	7	2				
												1	3		4	3	1	1			1	1	1				
1	2	1	4	4	1		1		1	1	1		1		1	1	1	1	1		2	1	1		1	32	56
130	116	19	265	138	7	6	35	3	44	37	5	1	4		5	2	1	4	5		9	9	2				
						1			1	1	1																
	1		1	1	1		1		1	1	1	2			2	2	1	1			1	1	1				
	1		1	1	1		2		2	1	1	1	1		2	1	1										
10	2		12	12	2	7	3	1	11	10	1	4	5		9	3	1	2	11		13	13	1				
						1	2		3	3	1	1	7		8	7	1	3	2		5	5	1				
												1	4		5	3	1										
							3		3	3	1																
												1	1		2	2	1										
												2	3		5	5	2		7		7	7	2				
												1			1	1	1										
																			1		1	1	1				
1			1	1	1																						
						1			1	1	1		1		1	1	1										
	2		2	2	1	1	1		2	2	2		12		12	8	1	3	3		6	3	1				
							2		2	2	1		4		4	3	1	3	6		9	9	1	1			
3			3	3	1																						
																		1			1	1					
5			5	5	1	2	1		3	3	1																
																			3		3	1	1				
10	8	2	20	18	4	4	13	1	18	17	3	7	23		30	22	3	12	17		29	29	4				2
												2	1		3	3	1										
3	5	1	9	8	5	1	5		6	6	1	4	6		10	6	2	1	9		10	10	2				
	3		3	3	2		2		2	2	1																
																											2
	3		3	2	2	1	3	1	5	4	1	2	3		5	5	2		3		3	2	1				
							1		1	1	1							1	3		4	4	1				
	3		3	2	1		2		2	2	1	2	13		15	10	2		5		5	5	1				
																									1		1
												1	3		4	4	1		5		5	5	1				
													1		1	1	1		1		1	1	1				
																									6		1
						1	2		3	3	2	2	3		5	5	2	3	3		6	6	2				
3	4	1	8	8	2		2		2	1	1	2	16		18	17	1	1	9		10	9	1				
																									1		
	3		3	3	1	1	6	1	8	8	3	5	13		18	18	2	5	12		17	17	2				
												8	12		20	14	1	5	22		27	16)	1				

LABORATORY DIVISION MINNESOTA

TABLE XIV—SHOWING DISTRIBUTION OF

	DIPHTHERIA																	
	Aug. 1, 1910, to Aug. 1, 1911									Aug. 1, 1911, to Aug. 1, 1912								
	Examinations				Cases					Examinations				Cases				
	+	−	R	Total	Pateints	Physicians	Release Negatives 0	1	2	+	−	R	Total	Patients	Physicians	Release Negatives 0	1	2
Walnut Grove	4			4	2		2			2			2	1	1	1		
Waltham		6		6	3	1					2		2	1	1			
Wanamingo		8		8	3	1				150	198	62	410	74	1	8		13
Warren	23	24	10	57	18	2	3	3		4	8	4	16	4	3			1
Warroad		6		6	3	1						1	1	1	1			
Waseca	2			2	1	1	1											
Watertown	37	35	4	76	18	2		8	4									
Waterville																		
Watkins	7	2	2	11	2	1		1			2		2	1	1			
Watson	1	2		3	3	1	1											
Waubun																		
Waverly										10	10		20	6	1	3		2
Wayzata	6	4		10	2	1	1											
Wells	5	8		13	4	1												
Westbrook	28	23	13	64	7	2			4	6	16	3	25	5	2		2	1
West Concord	1			1	1	1	1											
West St. Paul			1	1	1	1												
Wheaton	22	23		45	23	3	9											
White Bear	31	14	3	48	10	2	4		2	10	8	9	27	7	3	2		
White Earth												1	1	1	1			
Willmar	9	15	2	26	9	3	1	3		20	7		27	4	1	1		
Wilmot										2		2	4	2	1	1		
Windom	79	67	18	164	53	3	7	2		90	123	11	224	72	4	8	14	1
Winnebago										214	694	86	994	473	3	13	7	43
Winnebago Township																		
Winona	3	2	1	6	4	2	2			6	4		10	4	2	3	1	
Winthrop		27	1	28	11	2				5	2	2	9	2	1	1	1	
Withrow																		
Wolverton																		
Wood Lake										8	4	2	14	1	1		2	
Woodland Township																		
Worthington	205	1062	52	1319	703	5	7	20	37	18	48	24	90	4	3	1		3
Wrenshall	4	90	6	100	100	1	4											
Wykoff			2	2	2	1					3		3	1	1			
Wyoming																		
Young America		3	1	4	2					6	4		10	3	1	1	1	
Zions																		
Zumbro Falls																		
Zumbrota		16	2	18	5	1				52	140	26	218	43	3	2	1	8
Alberta, Can																		
Casselton, N. D																		
Ellendale, N. D																		
Enderlin, N. D																		
Glanavan Township, N. D																		
Pembina, N. D																		
Valley City, N. D																		
Wimbledon, N. D																		
Effington, S. D																		
Faulkton, S. D																		
Ft. Pierre, S. D																		
Huron, S. D																		
Newark, S. D																		
Pierre, S. D																		
Near Hanna, Wyo																		
Totals	3436	7080	988	11504	4597	470	326	273	330	4571	10245	1747	16563	5548	415	335	278	419

STATE BOARD OF HEALTH—Continued

WORK DONE BY MAIN LABORATORIES

TYPHOID												SPUTUMS FOR B. TUBERCULOSIS												Rabies Cases		Pasteur Cases	
Aug. 1, '10, to Aug. 1, '11						Aug. 1, '11, to Aug. 1, '12						Aug. 1, '10, to Aug. 1, '11						Aug. 1, '11, to Aug. 1, '12									
Examinations				Cases		Examinations				Cases		Examinations				Cases		Examinations				Cases		Aug '10 to Aug '11	Aug '11 to Aug '12	Aug '10 to Aug '11	Aug '11 to Aug '12
+	−	R	To- tal	Patients	Physicians	+	−	R	To- tal	Patients	Physicians	+	−	R	To- tal	Patients	Physicians	+	−	R	To tal	Patients	Physicians				
2			2	1	1																						
5	4	1	10	7	1		1		1	1	1		1		1	1	1		4		4	4	1				
												3			3	3	1		1		1	1	1				
12	10	2	24	21	2	6	9	2	17	14	2																
1	2		3	3	1		2		2	2	1	2			2	2	1							1			
												1			1	1	1		1		1	1	1				
												3	3		6	3	1	4	3		7	7	1				
																						1					
																			1		1	1	1		1	2	
																								2			
1		1	2	1	1							1	1		2	2	1	1	1		2	2	1				
	2		2	1	1		3	1	4	4	1	1	3		4	2	1		2		2	2	2				
	3		3	3	1		1		1	1	1	3	9		12	10	1	2	8		10	7	1				
								1	1	1	1		3		3	3	2		2		2	2	1				
																											1
						1	3	1	5	5	1														1		
2	3		5	5	2		4	1	5	4	1		1		1	1	1							1	2		
2	2		4	3	2	2	3		5	5	2														1		
2	2	1	5	5	2	2	1	1	4	3	1							4	1		5	5	1				
												1	2		3	3	1	1	1		2	2	1				
1	1		2	1	1	1	3	1	5	5	2	3	20		23	19	2	2	4		6	6	1				
																									1		3
1	9		10	9	2	1	7	2	10	9	2	9	9		18	18	2	6	12		18	18	3		2		
3	5	1	9	8	4							3	22		25	24	2	1	11		12	11	2				
																									1		1
																			1		1	1	1				
																											1
3	12		15	15	2	1	4		5	5	1	1	5		6	4	2	1	2		3	2	1				
																									1		1
	1		1	1	1																						
	1		1	1	1																						
												1			1	1	1		2		2	2	1				
												1	1		2	2	1		3		3	3	1				
1	1		2	2	1	3		1	4	3	1	1	4		5	5	22	1	2		3	3	1				
																											1
3	2	1	6	6	1														1		1	1	1				
																								2		2	
																									1		1
																										1	
						1			1	1	1							1			1	1	1				
																										2	
																										1	
																								1		1	1
																											1
																								1			
																										1	
																								2		2	
																								2		4	
																										1	
848	1232	113	2193	1879	401	478	980	147	1605	1362	352	305	960	5	1270	1103	270	327	945	6	1278	1150	280	42	82	134	247

TABLE XV—SHOWING WORK DONE BY LABORATORY FOR EACH COUNTY

COUNTY	Diphtheria		Typhoid		Sputum		Rabies		Pasteur Cases		Water				Ice	Milk		Spinal Fluids		Embalming Fluids		Total
	1910-11	1911-12	1910-11	1911-12	1910-11	1911-12	1910-11	1911-12	1910-11	1911-12	1910-11		1911-12		1910-11 1911-12	1910-11	1911-12	1910-11	1911-12	1910-11	1911-12	
											Bact.	Chem	Bact.	Chem	Bact.							
Aitkin	32	40	3	7	18	11					4	2	2	1								120
Anoka	3	16	19	15	18	7	3	5	5	3	20	5	72	46								237
Becker	39	48	21	35	19	30		4		1												197
Beltrami		6	4	47	1								6	1								65
Benton	77	4			5																	86
Big Stone	1	24			1	3																29
Blue Earth	173	56	33	61	20	83					16	16	12	6								476
Brown	21	19	3	10	55	41							1									150
Carlton	299	84	15	12	7	20		2		2	7	1	1	1								451
Carver	102	20	3	4	6		1	1					3	2								142
Cass	103	9		3	20	27		1		1												164
Chippewa	137	37	5	15		1			2	1												198
Chisago	70	17	14	11	14	19		1														146
Clay	12	13	1	5		6		1		1												39
Clearwater	2	16																				18
Cook																						
Cottonwood	253	285	6	8	35	18																605
Crow Wing	93	15	18	19	13	7					8	2	34	7								216
Dakota	631	322	7	7	7	11	2	2	2	7												998
Dodge	21	39	3	7	3	2																75
Douglas	21	88	2	3	25	16							6	3								164
Faribault	72	1,026	23	43	15	23		1	1	3												1,207
Fillmore	275	212	2	4	16	26		2		4												541
Freeborn	171	17	3	10	9	15																225
Goodhue	123	802	48	23	13	22					10	5	3	2								1,051
Grant	23	220	29	15	4	4																295
Hennepin	965	1,952	741	575	53	62	15	21	67	138	49	8	1					16	3	19	2	4,687
Houston	33	45			2	4		1														85
Hubbard	7	67	1	1	1	3																80
Isanti	22	49	1	3	31	26																132
Itasca	39	12	172	37	2	16					33	5										316
Jackson	10	47	8	2		5							6	3								81
Kanabec			23	11	1	10																45
Kandiyohi	53	31	6	6	2	7	1						2	3	9							120
Kittson	4	475	7	8	3	3																500
Koochiching	6	16	2	6		2	1		1				41	9								84
Lac qui Parle	41	6	48	26	8	12		1		1												143

Lake	1,465	36	93	32								2	36								1,664
Le Sueur	14	5	4		14	17		1													55
Lincoln	17		3	2	18	14															54
Lyon	3	29	3	2	1	2					3	2	4	2	3						54
McLeod	119	72	15	7	3	4				1											221
Mahnomen		1	1		8	5		2		2											22
Marshall	147	28	32	33	2	4	1											1	2		250
Martin	16	166	5	6	7	15					4	2									221
Meeker	53	10	3	9	18	8															101
Mille Lacs	62	29	19	23	5	26												1			165
Morrison	160	5	79	3	4	9					2	2	14	3							281
Mower	136	165	27	17	28	22															395
Murray	9	63	4	9	3																88
Nicollet	67	4,476	266	44	8	9				2	3	3									4,878
Nobles	1,363	123	16	17	13	11															1,513
Norman	7	10		1	20	18					5	2									63
Olmsted	513	596	37	86	20	15							6								1,273
Otter Tail	186	247	100	59	59	41		1		1	3	2						1			700
Pennington	18	4	9	7	15	12															65
Pine	10	160	14	12	16	17															229
Pipestone	23	39	13	11	15	11															112
Polk	52	46	54	18	39	39					23	5									276
Pope	12	39	9	4	12	14															90
Ramsey	214	1,449	9	6	28	6	4	9	35	64			2			62	56	3			1,917
Red Lake	59	6	2		3	2															72
Redwood	107	109	22	16	30	17															301
Renville	577	90	11	3	30	5															716
Rice	180	86	17	18	24	10					4	3	5	2	4						353
Rock	10	29	8	8	18	23															96
Roseau	55	13	4	1	17	19					6	3									118
Scott	94	49	11	7	9	26					1	1		2							200
Sherburne	265	83	4	7	18	8															385
Sibley	104	90	11	8	51	45					5	2									316
St. Louis	4,490	2,327	746	401	390	552		13		4	65	18	41	9		35	135				9,226
Stearns	317	97	21	33	68	53	1						13	4							607
Steele	51	18	11	11	7	21					6	6									134
Stevens	18	610		1	2	4			2		5	2									644
Swift	117	42	9	3	13	12	1	1													198
Todd	46	57	6	3	25	15															152
Traverse	45	2		11		11	1	1													71
Wabasha	772	662	21	28	21	23							5	2							1,531
Wadena	3	18	3	11	22	23															80
Waseca	4	11	1	2	5	5							6	2							36
Washington	101	206	29	1	32	3		5		7											384
Watonwan	17	11	15	15	8	11									3						80
Wilkin	9	3	6	3	1						59	12									93
Winona	102	51	10	11	18	23	1	3			5	1									228
Wright	160	267	25	21	39	104		2	1												619
Yellow Medicine	254	164	7	35	29	25							6	2				1			523
Outside state		1	8	1	6	1	10	1	18	4								1			51
Total	16,557	19,038	3,094	2,112	1,669	1,902	42	82	131	247	346	112	328	112	19	97	191	24	5	19	2	46,132

STATE BOARD OF HEALTH

REPORT OF THE

Division of Engineering

FOR THE TWO YEARS ENDING

AUGUST 1, 1912

FREDERIC BASS, DIRECTOR.

The Division of Engineering was created by the State Board of Health in April, 1910. The headquarters of this division are in the new Main Engineering building on the university campus where the facilities offered by the libraries, laboratories and blue print rooms of the College of Engineering are available for the benefit of the Board. Two offices immediately on the Interurban car line, very accessible to architects and engineers, and a store room for plans, are provided by the university.

The duties of this division are defined by the regulations adopted by the Board, as follows:

(a) To investigate the constructive and operating conditions of public water supplies, of sewerage and drainage systems, of public buildings, of public conveyances, of places of business, etc., insofar as they bear upon public sanitation.

(b) To report the result of investigations, together with recommendations, to the executive officer of the Board.

(c) To make special investigations in emergencies.

(d) To keep files of all work done and proposed, and to maintain same in readiness for the inspection of other divisions, the executive officer, or the Board.

(e) To prepare plans and specifications of construction work executed under the jurisdiction of the Board.

(f) To inspect plans and specifications of construction work submitted to the Board for approval and to report results of inspection to the executive officer of the Board.

(g) To prepare sanitary building ordinances for municipalities upon request.

(h) To prepare for the public the necessary general information relating to the foregoing.

(i) To arrange co-operative engineering work with other departments of the state government or with federal or municipal departments, which shall be subject to the approval of the Board.

(j) The offices, drafing rooms and files of the Engineering Division shall be located on the campus of the state university in quarters assigned by the College of Engineering, which shall be sufficient to meet the requirements of the work of the division.

The work of the two years covered by this report has consisted of the field inspection connected with nearly one hundred water and sewerage problems, both municipal and institutional, the analysis of data obtained with recommendations for procedure either for new construction or improvement of old, and the office examination of two hundred plans for new school buildings, the purpose being to ensure their compliance with the sanitary regulations established by the Board. Abstracts of this and other miscellaneous work are given in the following pages.

Each problem that has been presented has been made the subject of a special report to the executive officer of the Board. The general nature of these reports is outlined under the four main divisions of Water-Supply, Sewerage, School-buildings, and Miscellaneous. In some cases reports are given in full as illustrations.

The total number of cases of all kinds considered by this division during the biennial period has been approximately three hundred and twenty-five.

INDEX

County.	Location.	Character of Problem.	Date.	Page.
Aitkin	Aitkin	Water supply	Nov. 1910	411
	Bain	School	May 20, 1912	435
	Hill City	School	Sept. 21, 1911	435
	Malmo	School	Jan. 1, 1912	435
Anoka	Anoka	Water supply	Feb. 1911	411
	Anoka	Sewerage	Feb. 1912	420
	Anoka Asylum	Sewerage	Feb. 1912	421
	Columbia Heights	School	Oct. 13, 1910	435
Becker	Detroit	Sewerage	Sept. 12, 1911	421
	Frazeo	Sewerage	May 1911	421
Beltrami	Bemidji	Sewerage	Aug. 1910	421
			June 15, 1911	421
			Dec. 4, 1911	421
	Bemidji	School	July 7, 1912	435
	Pinewood	School	Mar. 9, 1912	435
	Tenstrike	School	June 26, 1912	435
Benton	No inspections in this county			
Big Stone	Ortonville	Sewerage	Sept. 26, 1910	421
Blue Earth	Amboy	School	Jan. 24, 1912	435
	Garden City	School	June 21, 1912	435
	Indian Lake	School	July 5, 1911	435
	Judson	School	Aug. 21, 1911	435
	Madison Lake	Water supply	Nov. 1, 1910	411
Brown	Comfrey	School	Sept. 6, 1911	435
	District No. 60	School	Mar. 29, 1912	435
	District No. 9	School	April 1, 1912	435
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	Moose Lake	School	Sept. 1, 1910	435
Carver	Chaska	School	April 7, 1911	435
	Norwood-Young America	School	Mar. 22, 1911	435
	Norwood-Young America	Sewerage	Mar. 1911	422
	Watertown	School	Sept. 9, 1910	435
Cass	Walker Sanatorium	Sewerage	Mar. 15, 1912	422
Chippewa	District No. 7	School	Sept. 6, 1910	435
Chisago	No inspections in this county			
Clay	District No. 52	School	June 19, 1911	435
	Glyndon	School	July 2, 1912	435
Clearwater	Shevlin	School	July 15, 1911	435
Cook	No inspections in this county			
Cottonwood	Jeffers	School	Feb. 2, 1912	435
	Windom	School	May 2, 1911	435

County.	Location.	Character of Problem.	Date.	Page.
Crow Wing	Brainerd	Water supply	Oct. 22, 1910	412
	Brainerd	Sewerage	Feb. 1912	422
	Deerwood	School	Aug. 24, 1910	435
Dakota	Hastings	School	Oct. 19, 1911	435
	Randolph	Sewerage	June 1911	422
	West St. Paul	School	Feb. 5, 1912	435
	West St. Paul	School	Feb. 5, 1912	435
	West St. Paul	School	Feb. 9, 1912	435
Dodge	Mantorville	School	June 10, 1911	435
	West Concord	School	May 19, 1911	435
Douglas	Kensington	School	April 11, 1912	435
	District No. 62	School		435
	Carlos	School		435
Faribault	Delavan	Sewerage	May 30, 1911	422
	District No. 122	School	Sept. 6, 1911	435
	District No. 103	School	June 17, 1911	435
	Elmore	School	July 15, 1912	435
Fillmore	District No. 107	School	Mar. 29, 1911	435
	Lanesboro	School	Mar. 9, 1912	435
	Spring Valley	School	Mar. 31, 1911	435
	District No. 20	School		435
	District No. 17	School		435
Freeborn	Hayward	School	June 24, 1912	436
	London	School	Dec. 5, 1911	436
	Newry	School	Sept. 24, 1910	436
Goodhue	Kenyon	Water supply	Nov. 5, 1910	412
	Kenyon	School	Aug. 15, 1912	436
	Red Wing	Water supply	Aug. 31, 1912	412
	Red Wing	Sewerage	May 11, 1912	422
Grant	Wendell	School	Sept. 2, 1910	436
Hennepin	Crystal Bay	School	Nov. 8, 1911	436
	District No. 140	School	Aug. 5, 1911	436
	District No. 68	School	June 29, 1911	436
	District No. 62	School	April 18, 1911	436
	District No. 79	School	June 17, 1911	436
	Excelsior	Water supply	Feb. 21, 1912	412
	Excelsior	Sewerage	Feb. 21, 1912	422
	Glen Lake	School	July 13, 1912	436
	Minnetonka Beach	School	Feb. 15, 1911	436
	St. Louis Park	School	July 13, 1912	436
Houston	Brownsville	School	May 21, 1910	436
	Spring Grove	School	Aug. 3, 1911	436
Hubbard	Hubbard	School	Sept. 6, 1910	436
Isanti	Braham	School	Aug. 13, 1910	436
Itasca	Calumet	Water supply	June 25, 1911	412
	Cohasset	School	May 1, 1911	436
	Marble	Water supply	Aug. 5-8, 1910	412
	Marble	Sewerage	Sept. 1910	422
	Pokegama Dam	Water supply	Dec. 1910	412
Jackson	No inspections in this county			
Kanabec	Ogilvie	School	July 1, 1911	436

County.	Location.	Character of Problem.	Date.	Page.
Kandiyohi	District No. 25	School	Mar. 18, 1912	436
	District No. 77	School	Aug. 5, 1912	436
	New London	School	April 9, 1912	436
	Raymond	School	April 5, 1912	436
	State Inebriate Hospital	Sewerage	Mar. 1912	422
	Svea	School	May 17, 1912	436
	Willmar	Sewerage	Mar. 6, 1911	423
Kittson	Halma	School	July 12, 1912	436
Koochiching	Birchdale	School	Aug. 16, 1911	436
	District No. 7	School	June 17, 1911	436
	Gemmel	School	Mar. 27, 1912	436
	Hoaglund	School	June 23, 1911	436
	International Falls	School	Sept. 9, 1912	436
	International Falls	Water supply	Nov. 1911	412
	Indus	School	June 11, 1912	436
	Lindford	School	June 23, 1911	436
	Lomen	School	Aug. 16, 1911	436
	Steffis	School	June 23, 1911	436
Lac qui Parle	Louisburg	School	May 17, 1911	436
Lake	Two Harbors	Water supply	Feb. 1912	412
	Two Harbors	Sewerage	Feb. 1912	423
Le Sueur	District No. 29	School	Mar. 20, 1912	436
	Le Sueur	School	July 7, 1911	436
	New Prague	Sewerage	April 1911	423
			May 1912	423
Lincoln	No inspections in this county			
Lyon	District No. 57	School	July 6, 1912	436
	Garvin	School	June 6, 1911	436
	Lynd	School	July 3, 1912	436
	Minneota	School	May 12, 1911	436
	Tracy	Water supply	Dec. 19, 1910	413
	Tracy	Sewerage	Sept. 1912	423
McLeod	District No. 11	School	April 5, 1912	436
	Hutchinson	School	July 15, 1912	436
	Hutchinson	Sewerage	June 1, 1911	423
	Silver Lake	School	July 15, 1912	436
	Stewart	School	Sept. 29, 1911	436
Mahnomen	Mahnomen	School	June 22, 1911	436
	Waubun	School	Aug. 28, 1911	436
Marshall	District No. 53	School	Aug. 13, 1910	436
	Holt	School	Sept. 30, 1910	436
	Warren	Sewerage	June 1, 1911	423
Martin	Fairmont	Water supply	Jan. 12, 1911	413
	Truman	School	Feb. 10, 1911	436
Meeker	Cedar Mills	School	Feb. 25, 1911	436
	Dassel	School	April 23, 1912	436
	Watkins	School	April 25, 1911	436
Mille Lacs	Wahkon	School	May 10, 1912	436
Morrison	Buckman	School	Feb. 9, 1911	436
	Little Falls	Water supply	April 27, 1912	413
			May 28, 1912	413
			June 10-11, '12	413
			June 27-29, '12	413
	Pierz	School	Sept. 2, 1911	436
	Randall	School	Sept. 7, 1910	436

County.	Location.	Character of Problem.	Date.	Page.
Mower	Bennington	School	Mar. 5, 1912	436
	Dexter	Water supply	Feb. 1911	416
	Leroy	School	June 6, 1912	436
Murray	Avoca	School	Aug. 13, 1910	436
	Lake Wilson	School	Dec. 20, 1910	436
Nicollet	Traverse	School	June 20, 1911	436
Nobles	Brewster	School	April 29, 1912	436
	District No. 111	School	July 25, 1911	436
	Reading	School	June 21, 1912	436
	Rushmore	School	July 12, 1912	436
	Westside	School	Oct. 10, 1910	436
Norman	Ada	School	Sept. 27, 1910	436
Olmsted	Rochester	School	Oct. 31, 1910	436
	Rochester	School	Nov. 7, 1910	436
	Rochester	School	Nov. 18, 1910	436
	Rochester Asylum	Sewerage	Jan. 25, 1911	423
Otter Tail	District No. 108	School	Sept. 7, 1911	437
	District No. 140	School	April 4, 1912	437
	Fergus Falls	Sewerage	Nov. 19, 1910	424
	Fergus Falls	Water supply	Nov. 19, 1910	416
			Dec. 31, 1910	416
Pennington	District No. 56	School	April 3, 1911	437
	Thief River Falls	Water supply	Mar. 28, 1912	416
	Thief River Falls	Sewerage	Mar. 28, 1912	424
Pine	Brook Park	School	April 12, 1912	437
	District No. 92	School	Dec. 5, 1911	437
	Hinckley	School	Jan. 13, 1911	437
	Rock Creek	School	July 7, 1911	437
Pipestone	Artichoke Lake	School	Oct. 23, 1910	437
	Edgerton	School	May 28, 1912	437
	Holland	School	Sept. 29, 1911	437
	Jasper	School	Oct. 20, 1910	437
	Pipestone	Sewerage	Oct. 9-10, 1911	424
Polk	Crookston	Water supply	Feb. 1911	416
			Mar. 27, 1912	416
	District No. 45	School	June 12, 1912	437
	District No. 282	School	June 12, 1912	437
	McIntosh	School	May 6, 1912	437
Pope	Farwell	School	Sept. 26, 1910	437
	Glenwood	School	Oct. 19, 1910	437
	Villard	School	July 17, 1912	437
Ramsey	White Bear	Sewerage	Dec. 31, 1911	431
	Red Lake Falls	Sewerage	Mar. 27, 1912	431
Redwood	Clement	School	May 27, 1911	437
	District No. 21	School	Sept. 14, 1910	437
	District No. 2	School	July 5, 1911	437
	District No. 28	School	Feb. 29, 1912	437
	Sanborn	School	Aug. 16, 1910	437
Renville	Fairfax	Sewerage	April 1912	431
	District No. 72	School	June 22, 1912	437
Rice	District No. 16	School	Mar. 29, 1912	437
	Faribault	Sewerage	May 1911	431
	Morristown	School	June 21, 1912	440
	Nerstrand	Sewerage	Aug. 1912	431
	Northfield	Water supply	Jan. 14, 1911	416

County.	Location.	Character of Problem.	Date.	Page.
Rock	District No. 47	School	July 10, 1912	437
	District No. 16	School	July 10, 1912	437
	Luverne	Water supply	April 1911	417
	Steen	School	July 9, 1912	437
Roseau	Roosevelt	School	Mar. 26, 1912	437
	Roseau	School	April 16, 1912	437
	Swift	School	Aug. 1, 1911	437
Scott	Jordan Sanatorium	Sewerage	April 1912	431
	Keystone	School	Feb. 22, 1911	437
	Knapp	School	Feb. 22, 1911	437
	Belle Plaine	School	May 27, 1913	437
Sherburne	Elk River	School	May 28, 1912	437
	Monticello	School	June 13, 1911	437
Sibley	Winthrop	School	July 13, 1911	437
St. Louis	Adriatic Location	School	Oct. 13, 1911	437
	Alborn	School	Oct. 20, 1910	437
	Arnold	School	July 1, 1912	437
	Aurora	School	April 14, 1911	437
	Aurora	Water supply	Feb. 8, 1911	417
	Biwabik	School	May 15, 1912	437
	Buhl	School	April 8, 1912	437
	Chisholm	School	Feb. 9, 1911	437
	Chisholm	Sewerage	May 1911	431
	District No. 25	School	Aug. 7, 1911	437
	Duluth	Sewerage	Sept. 1910	431
			to	
			Feb. 1911	431
	Ely	School	May 8, 1912	437
	Ely	Water supply	Nov. 28, 1910	417
	Ely	Sewerage	Nov. 23, 1910	431 432
			June 24, 1912	431 432
	Eveleth	School	June 5, 1911	437
	Eveleth	School	Mar. 25, 1912	437
	Floodwood	School	Sept. 2, 1910	437
	Gilbert	School	Aug. 3, 1910	437
	Gilbert	Sewerage	July 12, 1911	432
			June 24, 1912	432
	Hibbing	Water supply	Sept. 22, 1910	417
	Hibbing	Sewerage	Sept. 1910	432
	Meadowlands	School	Feb. 23, 1912	437
	Mt. Iron	School	Oct. 10, 1910	437
	Mt. Iron	School	June 6, 1911	437
	Normana	School	May 27, 1912	437
	Proctor	Sewerage	April 11, 1911	432
	St. Louis County Sanatorium	Water supply	1910	417
	St. Louis County Sanatorium	Sewerage	1910	432
	Virginia	Water supply	June 2, 1911	417
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	Villa Scholastica	Water supply	April 11, 1911	417
	Winton	School	May 13, 1912	437
	Wilpen	Water supply	July 14, 1911	417

County.	Location.	Character of Problem.	Date.	Page.
Stearns	Albany	Sewerage	Nov. 10, 1911	432
	Avon	School	April 7, 1911	437
	Belgrade	School	June 29, 1911	437
	Cold Spring	Sewerage	Sept. 26, 1911	434
	Holdingford	School	June 29, 1911	437
	Kimball	School	July 6, 1911	437
	Lake George	School	Sept. 12, 1910	437
	Paynesville	School	June 27, 1911	437
	St. Joseph	School	July 27, 1911	437
	Sauk Center	School	May 20, 1912	437
Steele	Medford	School	Nov. 30, 1910	437
			Dec. 8, 1911	437
Stevens	Alberta	School	April 1, 1912	437
	Hancock	School	July 5, 1912	437
	Morris	Sewerage	Oct. 11, 1911	434
Swift	Kerkhoven	School	Mar. 8, 1912	437
Todd	Hewitt	School	Sept. 1, 1911	437
	Long Prairie	Sewerage	Sept. 1910	434
Traverse	Wheaton	School	Dec. 13, 1911	438
Wabasha	Lake City	Water supply	July 7, 1912	417
	Mazeppa	School	June 13, 1912	438
	Plainview	Water supply	Dec. 19, 1911	417
	Zumbro Falls	Water supply	May 17, 1911	417
Wadena	Wadena	Water supply	April 2, 1912	418
	Wadena	Sewerage	Sept. 27, 1911	434
			April 2, 1912	434
Waseca	District No. 43	School	Sept. 27, 1910	438
	Waseca	School	Jan. 8, 1911	438
Washington	Afton	School	Feb. 27, 1911	438
	Dellwood	School	Mar. 29, 1912	438
	Fairmont	Sewerage	Jan. 12, 1911	434
			Aug. 1911	434
	Lake Elmo	School	Mar. 23, 1911	438
	District No. 5	School	June 6, 1912	438
Watonwan	No inspections in this county			
Wilkin	Andrea	School	June 5, 1911	438
	Breckenridge	Water supply	Nov. 11, 1910	418
	District No. 75	School	Sept. 7, 1911	438
Winona	District No. 61	School	July 5, 1911	438
	District No. 1	School	April 20, 1911	438
	Dresbach	School	May 16, 1912	438
	Kellogg	School	April 12, 1912	438
	Winona	Water supply	Jan. 29, 1911	418
Wright	Howard Lake	Water supply	June 20, 1911	418
Yellow Medicine	Canby	Sewerage	May 10-11, '12	434
	Granite Falls	School	June 4, 1912	434

PART I.—WATER SUPPLY.

INTRODUCTORY.

The water supply problems upon which the Engineering Division has reported during the biennial period ending August 1, 1912, have largely related to improvement of existing conditions, since practically every city and village in the state of eight hundred inhabitants or over has a water supply system already installed which is satisfactory so far as quantity is concerned. In several cases, advice has been given on the question of a new supply.

The work of the Division of Engineering relating to quality of water has consisted of the examination of systems with a view to detecting construction allowing pollution to enter the supply, with recommendaions for construction to prevent pollution in the case of new supplies, the probable dangers of various plans and means of avoiding them being considered; the installation of permanent hypochlorite plants, and the setting up of the temporary hypochlorite plant. Since April 12, 1912, the temporary hypochlorite plant has, by order of the executive officer of the Board, been in charge of the Laboratory division. The collection of samples of water is at present, by order of the executive officer, entirely in charge of the director of the Laboratory Division.

The work of the Engineering Division is limited to the construction features. General advice is given, with approximate estimates of cost. Detailed plans are furnished only for hypochlorite plants and in cases of emergency.

The report on the installation of the hypochlorite plant at Little Falls is given in full to show the form of report and the work done.

AITKIN COUNTY.

Aitkin—A trip was made to Aitkin by a representative from the Laboratory Division, in compliance with a request from the local health officer. The present water supply is from Mud River. On the findings, the river supply was recommended to be abandoned and a four-inch to eight-inch artesian well was recommended by the Engineering Division. Further assistance in case construction should be contemplated was offered. (See Laboratory Report, page 336.)

ANOKA COUNTY.

Anoka—In February, 1911, a typhoid epidemic prevalent in Anoka was investigated by the Epidemiological Division, which appeared to be due in part to polluted public water supply. (See report of Epidemiological Division, page 240.) Upon request, the emergency hypocholorite plant was installed on February 22, 1911. Samples of water were collected after the plant was operating, and showed the polluted condition of the raw water and the absence of danger in the treated water. (See Laboratory Report, page 336, and report of the Division of Epidemiology, page 240.)

Anoka has since decided to abandon the Rum river as a source of supply in favor of artesian wells. Information in regard to an artesian supply was furnished upon request.

BLUE EARTH COUNTY.

Madison Lake—The village clerk requested aid in the installation of a new water supply. An inspector visited the village on November 1, 1910, and made certain recommendations in regard to the location of the well, which were concurred in by the consulting engineer employed by the village.

BROWN COUNTY.

New Ulm—On request of the health officer, an examination of the existing water supply was made. Studies for an additional supply for the city were made and various sources of supply were found available. A careful survey to determine the relative costs of these supplies was recommended. Filtered Minnesota river water seemed to be most economical. (See Laboratory Report, page 336.)

CARLTON COUNTY.

Cloquet—A trip to Cloquet was made upon request from the health officer, to examine reservoirs recently repaired. Samples of water were collected. (See Laboratory Report, page 336.) A subsequent examination was made in compliance with a request from the health officer. The reservoirs were found in good condition, and samples of water were collected. (See Laboratory Report, page 336.) A connection exists between the city mains and those of lumber companies, this arrangement being for fire protection. Storage of water was recommended to obviate the pumping of river water into the mains from the lumber companies' supply. The present arrangement may be the cause of a serious epidemic.

CROW WING COUNTY.

Brainerd—An inspection of the water system was requested by the Water and Light Department of Brainerd. Temporary improvement of the quality of the water was asked for. The hypochlorite plant was recommended, and installed. The city employed a civil engineer with special laboratory training to operate the plant. (See Laboratory Report, page 336; Epidemiological Report, page 242.)

GOODHUE COUNTY.

Kenyon—On November 5, 1910, a representative of the Engineering Division visited Kenyon for the purpose of examining and collecting samples from the existing water supply and also from a drilled well belonging to the C., M. & St. P. R. R. The recommendation was made that a drilled well be constructed for the city supply and that the present source be abandoned. (See Laboratory Report, page 336.)

Red Wing—The health officer requested suggestions in regard to cleaning the reservoir and water mains preparatory to changing the city water supply from river water to artesian water. An inspector visited Red Wing, and gave directions for disinfection with hypochlorite. Samples of water were collected for analysis (See report of the Laboratory Division, page 336.)

HENNEPIN COUNTY.

Excelsior—Excelsior was visited at the request of two of the council members. A lecture was given in the village hall on the local situation February 21, 1912. Estimates of cost were given and methods of procedure outlined. The various sources of supply were compared and the village was advised to employ an engineer to draw detailed plans.

ITASCA COUNTY.

Calumet—The village water supply was examined June 25, 1911, on request from the health officer. The water was found to have a strong sulphide odor and also to be open to contamination through an opening about the suction pipe. Detail instructions were given for construction to prevent further contamination. (See Laboratory Report, page 336.)

Coleraine—An inspector visited Coleraine on September 21, 1910, and examined the water supply and collected samples from five sources.—a spring on the shore of Trout Lake; a spring located near the first spring, both being open to contamination; the water from Trout Lake, used in the washing plant, which was open to contamination; dug and driven well at washing plant, possibly contaminated by surface water; and the city supply of Coleraine, taken from a mine drift. The city supply was apparently of good sanitary quality. It was recommended that a driven well be provided for the use of the people at the washing plant. (See report of Laboratory Division, page 336.)

Marble—An epidemic of dysentery and typhoid fever reported to the Division of Epidemiology caused an investigation to be made August 5-8, 1910, of the various water supplies of Marble. In tne Marble hotel, a cess pool was found which periodically overflowed into a well from which water was served on the hotel table. The well was disinfected and the hotel proprietor warned to obtain the water supply elsewhere. In another case, it was found that the man distributing spring water originally good was also engaged in the business of cleaning out cess pools and privies. Other deep well supplies were examined and found satisfactory. The Health Officer was informed of the results of the investigation, in which the Division of Epidemiology co-operated. So far as is known, the source of water supply at the hotel was not changed. Since this investigation, a public water supply and a public sewer system have been installed. (See Laboratory Report, page 336.)

Pokegama Dam—On request of Major F. R. Shunk, U. S. A., on December 23, 1910, an investigation was made by the Laboratory Division and a well at Pokegama Dam was found to have unsanitary surroundings. Recommendations were made for proper construction. (See report of the Laboratory Division, page 336.)

KOOCHICHING COUNTY.

International Falls—A typhoid fever outbreak at International Falls in October, 1911, was found to be caused by the water. (See report of the Division of Epidemiology, page 243.) The emergency hypochlorite plant was set up and later a permanent plant, which was put into operation December 1, 1911. This was the first permanent hypochlorite plant installed under the direction of this Board.

LAKE COUNTY.

Two Harbors—In the Third Biennial Report of the State Board of Health (1909-10) on page 256, relative to the water supply of Two Harbors, the statement was made that the water supply was dangerous on account of sewage discharging into Lake Superior a short distance from the waterworks intake. A hypochlorite plant was recommended for treating the water, but it was not constructed. The attention of the city authorities was called to the danger to which they were exposed, on several occasions, by the Executive Officer of the Board. In February, 1912, the State Board of Health was informed that a typhoid epidemic was raging in Two Harbors. The emergency plant was shipped and put into operation on February 29, under the direction of the Engineering and Laboratory Divisions. (See report of the Laboratory Division, page 336.) The epidemic was suppressed. (See report of the Epidemiological Division, page 214.)

LYON COUNTY.

Tracy—December 7, 1910, the local health officer requested an analysis of the water from Lake Sigel. The city water supply of Tracy was obtained from a drilled well about 600 feet in depth. In November and December, 1910, the yield of the well suddenly decreased and water from Lake Sigel was to be used while the well was being cleared out. December 19, an inspection was made and samples of well water and water from Lake Sigel were collected, and sent to the Laboratory Division for analysis. (See report of the Laboratory Division, page 336.)

MARTIN COUNTY.

Fairmont—In September, 1910, the health officer of Fairmont asked for advice in constructing an intake and a water filter for the public water supply. References for reading were sent, and on January 12, 1911, an inspection of the works was made. Samples of water were collected and sent to the Laboratory Division for analysis. (See report of the Laboratory Division, page 336.) The proposed construction was abandoned, as recommended. The city was advised to install a filter plant of standard construction or to use artesian water.

MORRISON COUNTY.

Little Falls—April 23, 1912, the manager of the Little Falls Water Power Company requested information in regard to a hypochlorite plant for the disinfection of water supplied to Little Falls. The Engineering Division made plans for, and installed a permanent hypochlorite plant. The following report is representative of this class of work:

REPORT ON INSTALLATION OF PERMANENT HYPOCHLORITE WATER DISINFECTING PLANT AT LITTLE FALLS, MINNESOTA, JULY 6, 1912.

J. A. Childs.

History.

April 23, 1912—Mr. T. C. Gordon, General Manager of the Little Falls Water Power Company, the corporation supplying water to the City of Little Falls, called at the office of the Engineering Division for information regarding the construction of a permanent hypochlorite plant for disinfecting the water suppled to the city.

April 27, 1912—Mr. Bass visited Little Falls for the purpose of gathering necessary data on which to base the design of the plant.

May 21, 1912—Plans completed. Mixing tank and regulating keg constructed and shipped, and storage barrels painted with a bituminous paint.

May 28, 1912—Writer visited Little Falls. Gave directions as to placing mixer and storage barrels; checked up list of piping and valves to be ordered.

June 10-11, 1912—Piping and valves fitted, motor and regulating keg set up under the personal supervision of the writer. Gave directions as to painting and tapping supply main.

June 27-29, 1912—Writer again visited Little Falls, adjusted regulating keg, had feed pipes connected with suction mains of pumps and instructed attendants as to operation of the plant.

Description of Plant.

The plant consists of mixing tank and motor, three storage barrels, regulating keg, float valve, water seal box to prevent air from entering suction mains, necessary valves and piping.

The plant has been carefully constructed, painted white, making a very neat appearance.

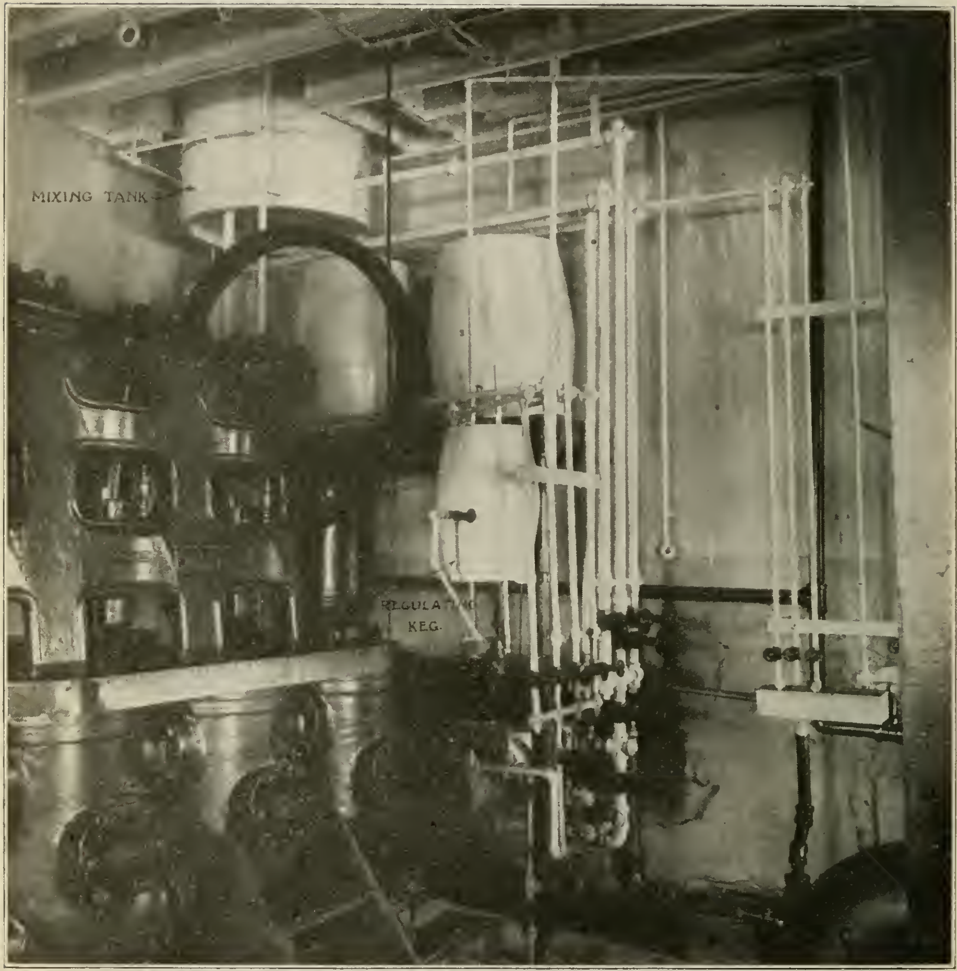


FIG. 1—LITTLE FALLS, HYPOCHLORITE PLANT.

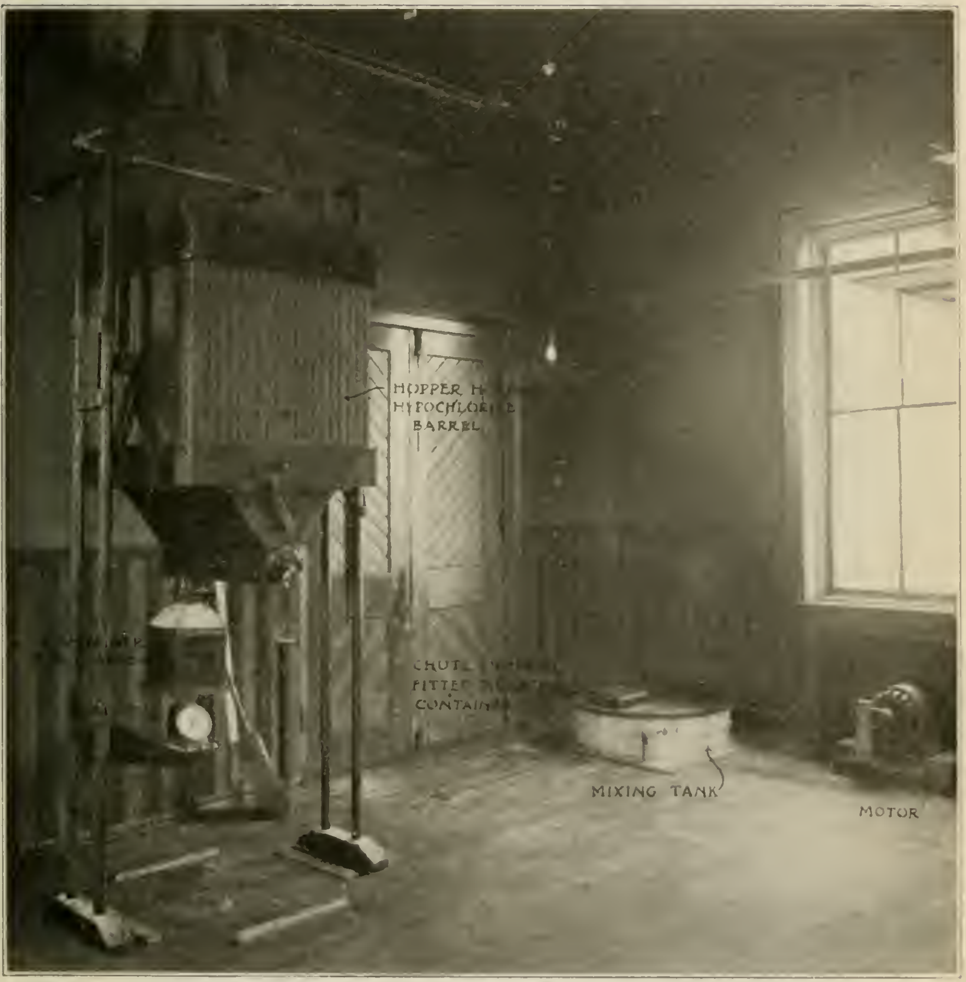


FIG. 2—LITTLE FALLS. WEIGHING DEVICE FOR HYPOCHLORITE.

The new features of this plant are:

1. Crosses and plugs used exclusively at all right angle bends on pipes carrying hypochlorite solution. Object—easy cleaning of pipes if clogged.
2. Emergency feed pipe from regulation keg by means of which amount of hypochlorite solution added may be increased in case of fire.
3. Piping system connected with pressure system in such a way that any solution pipe in system may be flushed out with water under pressure.
4. Clean out pipes provided for mixer and storage barrels.

Cost.

The cost of this plant was about $230.

Water Pumped.

The pumps were operating at the time of the writer's last visit at the following rates, allowance being made for slip:

Triplex pump: 34 R. P. M. About 450 gallons per minute, or about 650,000 gallons per day.

Horizontal duplex: 23 R. P. M. About 450 gallons per minute, or about 650,000 gallons per day.

The pumps are each delivering approximately the same amount of water per day, a total of about 1,300,000 gallons per day.

Operation.

Charge—8 pounds of hypochlorite to 90 gallons or mixer of water. Mix ten minutes. Allow to settle six hours and draw off into storage barrels.

Regulating keg set to feed hypochlorite solution to each pump at the rate of 450 cubic centimeters per minute, or a total of 900 c. c. of solution per minute to total water pumped.

Plant recharged every six hours. Thirty-two pounds per day of hypochlorite used, being about one part per million of available chlorine.

Summary and Conclusion.

The plant was completed and put into operation June 28, 1912.

The plant is now in shape to be tested by the Laboratory Division in order that the correct amount of hypochlorite may be added for best results.

T. C. Gordon, Little Falls, is general manager of the Little Falls Water Power Company. The plant is owned and operated by this company.

Dr. Norman M. Chance is the local health officer.

MOWER COUNTY.

Dexter—On February 12, 1911, advice was asked in regard to making use of a certain well for public water supply. An offer of assistance was made and accepted, but the improvement was voted down at the election, and no field investigation was made.

OTTERTAIL COUNTY.

Fergus Falls—In October, 1910, the Sewer Committee asked advice in regard to a water supply and ice supply. The ice supply was taken from the river below a point where several privies and refuse dumps were located on the bank. An inspection was made on November 19, 1910, and the sanitary surroundings of the ice field reported to be very bad. Another inspection December 31, 1910, showed that ice cutting had been stopped by the local health officer.

The water supply from the Red river was recommended to be treated with hypochlorite. A plant has since been installed.

PENNINGTON COUNTY.

Thief River Falls—An examination of the source of the city water supply was made in March, 1912. The supply is from a drilled well. There is also an emergency fire intake leading from Red Lake river, which at this point is polluted. The Superintendent of the Waterworks was informed of the ease with which this water could be treated with calcium hypochlorite in case it was necessary to use it, and advised that a plant be constructed and kept in readiness for emergencies.

POLK COUNTY.

Crookston—Upon request of the Board of Education and the health officer of Crookston, information was furnished on the hypochlorite treatment of water. The manager of the Water company visited the office of the Engineering Division of the Board in January, 1911, and made arrangements for the installation of a plant. A hypochlorite plant was installed under the supervision of the Engineering Division and has been in constant use ever since. (See Laboratory Report, page 338, for results.)

RICE COUNTY.

Northfield—On January 12, 1911, the health officer of Northfield requested an examination of the existing water supply. An inspection was made on January 14. Samples of the water were collected for analysis by the Laboratory Division. (See report of the Laboratory Division, page 338.) It was found, that a sand catcher between the well and the pumps had an overflow to the sewer, similar to that at Mankato which caused the fatal epidemic there. This fact was emphasized in the report upon the supply. So far as is known, the condition has not been rectified.

ROCK COUNTY.

Luverne—The Superintendent of Waterworks, on April 20, 1911, requested advice as to the removal of iron from the city water supply. After having conferred with the Laboratory Division, the Engineering Division prepared preliminary plans and estimates of cost for an iron removal plant. The cost was estimated at $2,800. The improvement has not been made.

ST. LOUIS COUNTY.

Aurora—A request was received on February 8, 1911, from the health officer of Aurora as to the best means of protecting the city from creek water which would have to be used during temporary repairs to the village well. The emergency hypochlorite plant was called to the attention of the village authorities, and suggested for use, but the offer was not taken advantage of.

Ely—On November 28, 1910, the water purification plant at Ely was inspected and samples of water were collected. (See report of the Laboratory Division, page 338.) Recommendations were made for a change of sand and the installation of a hypochlorite plant in order to effect certain advantages of operation.

Hibbing—An inspection of the hypochlorite plant installed in June, 1910, was made on September 22, 1910. Samples of water were collected and analyzed by the Laboratory Division. (See report of the Laboratory Division, page 338.) The plant was found to be operating satisfactorily.

Mitchell—On November 22, 1910, a representative of the Engineering Division visited Mitchell and examined a new well constructed by the D., M. & N. R. R. for the use of employes at Mitchell. The well was found to be in good sanitary condition. (See Laboratory Report, page 338.)

Mt. Iron—On June 24, and July 15, 1911, a representative of the Engineering Division visited Mt. Iron for the purpose of collecting samples of water used as the city supply, which was pumped from an abandoned mine shaft. The water had a disagreeable odor and was open to contamination. It was recommended that the hypochlorite treatment be used and that as soon as feasible a new supply be obtained. (See Laboratory Report, page 338)

St. Louis County Sanatorium—In 1910 the Engineering Division, upon request, sent a representative to the site of the St. Louis County Sanatorium to study sources of water supply. Three possible sources were studied, and recommendations were made to the Commission so that they could still further carry on the investigation. Estimates of approximate costs were furnished and the Commission was assisted in obtaining the services of an engineer. A successful ground water supply sufficient for present needs was found, although the cost has been considerable.

Villa Scholastica, Duluth—The epidemiologist of the city of Duluth, in March, 1911, asked for an examination of the various water supplies of Villa Scholastica, an educational institution in Duluth. An examination of the ground was made by a representative of the Engineering Division on April 11, 1911, and a spring water supply was recommended.

Virginia—An investigation of the public water supply of Virginia was made on June 2, 1911, in response to a request from the health officer. The water was taken from two deep wells, one four hundred and fifteen and the other three hundred and fifty feet in depth. Samples of water were collected for analysis by the Laboratory Division. (See report of the Laboratory Division, page 338.) It was found that there was an emergency intake from the lumber yards, which would make it possible for water from Silver Lake to enter the mains of the city, and as the water from this lake is highly polluted, the danger was pointed out to local officials. It was recommended that a hypochlorite plant be kept in readiness to treat the water in case it was necessary to use it.

Wilpen—On June 24, 1911, the superintendent of construction of the E. I. du Pont de Nemours Powder Company asked for an analysis of the water to be supplied to the community dependent upon the company. An inspection was made on July 14, and samples of water collected for analysis. (See report of the Laboratory Division, page 338.) Recommendations were made in regard to diverting surface water in the vicinity of the wells.

SCOTT COUNTY.

Shakopee—On December 5, 1910, an investigation was made of a private well and samples of the water taken. The water was complained of on account of an oily odor and taste. The recommendation was made that the well be abandoned. (See Laboratory Report, page 338.)

WABASHA COUNTY.

Lake City—On June 8, 1912, the health officer requested advice in regard to the water supply. The existing water supply and the possibilities for a new supply were investigated on July 7, 1912, and samples of water collected for analysis. (See report of the Laboratory Division, page 338.) The present water supply was recommended to be developed.

Plainview—The health officer requested an examination of the water supply, which was said to smell of kerosene. An investigation was made on December 19, 1911, and samples of water collected for analysis. (See report of the Laboratory Division, page 338.) The overflow from the pump pit to a drain was found to be connected with a cellar in which kerosene was stored. Other injurious pollution might easily travel the same route and recommendations for construction to prevent such an occurrence were made.

Zumbro Falls—The village recorder of Zumbro Falls, on May 4, 1911, asked for advice regarding the construction of private septic tanks which he thought might endanger the purity of the village water supply. On May 17, the wells supplying the village were examined, together with their surroundings. Recommendations were made in regard to curbing the wells, and making certain cess pools water tight.

WADENA COUNTY.

Wadena—On request of a council member, a lecture was given before the members of the City Council and the Commercial Club on the improvement of the waterworks and the establishment of a sewerage system for the village. The existing water supply is taken from a shallow dug well about thirty feet in depth. Indications were that the underground water here flowed from south to north, so that the water taken from the well had previously passed under the village, in which many cess-pools were located. Previous examinations of this water supply by the Laboratory Division had shown contamination at certain times. It was recommended that improvements be made in the near future, both to protect the quality and to increase the quantity of this water supply.

WILKIN COUNTY.

Breckenridge—A hypochlorite plant was recommended by the Board to supplement a rapid-sand filtration plant already installed. Plans for such a plant were prepared, but a more expensive plant from a filter company was installed.

WINONA COUNTY.

Winona—The secretary of the Board of Municipal Works of Winona asked for information in regard to a hypochlorite plant for the treatment of the public water supply. On January 29, 1911, samples of the different sources were taken for analysis. (See report of the Laboratory Division, page 338.) Further information was given personally to the waterworks superintendent at this time in regard to the hypochlorite plant.

WRIGHT COUNTY.

Howard Lake—On June 7, 1911, the health officer requested advice on the disposal of waste from the creamery. On June 20 an investigation was made. The water supply for the village was found to be from Howard Lake, which was polluted. It was recommended that the water be filtered before use.

SUMMARY.

Trips of field inspection—38.

Advice by correspondence only—6.

Emergency hypochlorite plants set up—3.

Permanent hypochlorite plants installed—4.

PART II.—SEWERAGE.

Requests from municipalities for advice in regard to proposed sewerage systems, in regard to proposed disposal works on existing systems, and in regard to complaints of nuisances at outlets or along the line of sewer pipes, have constituted the greater part of this work.

There have been forty-seven problems handled, the most extensive being at Duluth, Chisholm, Willmar, Ortonville and Ely, involving new construction. At Pipestone, the most interesting investigation of a nuisance was made, and in passing, it may be said that it is but one of twenty-five sewage disposal plants in the state that need more careful supervision than they are now receiving.

A number of requests have been received for plans for small house and institutional sewage disposal tanks and filters. As an examination of the site would often involve a long journey and the drawing of plans, making the expense of investigation nearly equal to the cost of construction, the division has prepared standard plans as follows:

(1) House sewage disposal plant; (2) Small school or institutional plant; (3) Large school or institutional plant.

The plans for sewage disposal at state institutions have been submitted for approval to this division, as follows: Anoka, Walker, Willmar. In one case, that of Willmar, the advice of this division was followed.

It is desirable here to call attention to a very important feature of sewage disposal plants. They need skilled supervision in order to do the work they are designed to do. They are not automatic. Unfortunately, there is a general impression that they are automatic, that they are of the same nature as the pipes in which the sewage flows, that is, they may be left alone until some stoppage occurs and then may be easily repaired. Cities and villages that neglect to keep sewage disposal plants in condition are pursuing the most expensive course. There should be in each case some person charged with the responsibility of these plants, who should know of the fact of the State Board of Health's interest in the plant and ability to inform him on points of operation. Regular inspections of such plants are now being made. The report on the inspection of the Pipestone plant is given in full.

Attention is here called to the fact that in many small cities where some treatment of the sewage is desirable, that combined sewers or those large enough to take both house sewage and storm water are often recommended where their construction is extremely expensive and not adapted to the local situation. The most striking instance of this is found in the city of Duluth, where the State Board of Health through co-operation with a body of citizens indicated the design for a separate sewer, since built by the city engineer, and saved the city of Duluth something over $100,000. In other cases, smaller but considerable sums have been saved.

In a number of instances, city engineers and consulting engineers have obtained extended consultations at the office of this division, some preparing plans in this office during a stay of a week or more, under the general direction and criticism of the division. In this way, they have been enabled to gain information in regard to design that they could obtain in no other way than by consulting engineers in New York or Chicago, or by takig post-graduate courses in a university. The works which they have so designed will, however, need constant care to be successful and efficient.

It has been the policy not to interfere with the practice of engineers engaged in private practice, but to give advice and information freely to all. In one case, however, that of the St. Louis County Tuberculosis Sanatorium, complete plans and specifications were prepared for a sewage disposal plant, as the sanatorium board in charge was unable with the funds they had to complete their work. The said board employed an engineer to design the water works system, and with his consent, the division performed the work for this public institution. With this single small exception, applicants have been referred to consulting engineers for detailed plans and specifications.

It has been the history of sewerage systems that need for drainage of the soil has preceded the need for house waste disposal. In a number of instances in Minnesota noticed by this division, pipe systems have been laid in the streets with the object of removing the water from the ground and keeping the basements dry. Even though ordinances have in some instances been enacted to prevent house sewerage connections, these have been later made under special permits. This practice has nearly always led to complications as the construction methods in the two systems are different. History repeats itself and the information collected by this division has a money value to cities and villages contemplating construction.

ANOKA COUNTY.

Anoka—Several investigations were made by the Engineering Division from February 27 to March 1, 1912, to establish facts connected with the pollution of the Rum river by the city of Anoka. The city of Minneapolis, through its city attorney, entered a complaint to the State Board of Health against this pollution.

This case brings up in a very striking way the problem of prevention of stream pollution. The Mississippi river as it flows through the state is the source of public water supply for several hundred thousand persons. It is also the place of disposal of the sewage above the principal intakes for public water supplies of thousands of persons, most of whom are living in communities supplied with sewerage systems more or less extensive; many others run sewage into the river from private houses and from manufacturing plants.

The city of Minneapolis is the farthest municipality down stream taking water from the river for public use and as it has such a relatively large population and must take its water from the river, and as the cities above are polluting it, the question arises to what extent, if any, should such pollution be allowed to continue. The state law is very explicit on the point. No pollution may be allowed. As a matter of fact, no attempt whatever had been made to prevent pollution until the city of Minneapolis complained of the sewage of the city of Anoka.

There is a great difference in the point of view of these two communities in question, and it is the typical differences between any two communities similarly located. The community on the upper reaches of the river claims that it needs a sewer system for both the protection of the health of its own citizens and for their convenience, and that since water is necessary to a sewerage system, and it must run down hill, the sewage must finally find its way to the river. It furthermore claims that it is very costly and difficult to keep out all pollution and since some must occur, it is necessary for the city below to protect itself by purifying the water it uses, which is a relatively easy thing to do, and can be done with certainty. And still further, since this purification is as effective with water considerably polluted as with water only slightly polluted, the question of sewage purification is relatively unimportant.

The city down stream has, by sad experience, come to realize the great danger of polluted water, but at the same time, on account of the general apathy to human suffering when it is the result of slow disease and not accident, it has allowed itself to continue using such water, and has insisted that its rights to the use of such water as flowed past its own shores included the right to such water in a pure state. The law of the land is constructed on this principle.

The actual result has been the neglect of law and loss of life. The important thing is to prevent loss of life and if the present law is not operative in this direction, we should have one that is. Such a law should recognize the necessities of both the upper and lower communities and also the physical limitations of the situation. It is evidently impossible to stop all pollution and hence the lower city must, in order to protect the lives of its citizens, purify the water used by them The law should require every community to supply pure and healthful water to its citizens.

With this principle granted, a law could be passed providing for the establishment and maintenance of a standard of purity for each stream based upon a reasonable and enforceable requirement to be established by the State Board of Health. No two streams would necessarily have the same standard. It may be that conditions would arise which would necessitate changes in the standards of purity from time to time and the Board of Health should have power to vary them according to the necessities of each case. Only in this way, that is by placing the most emphasis on the requirement for pure water for domestic use, rather than on **absolute** non-pollution of streams, can the public health be best protected. (See report of the Laboratory Division for results of sanitary survey.)

Anoka Asylum—The addition of several cottages to the State Asylum at Anoka necessitated the construction of a new sewerage system. The State Board of Control asked the State Board of Health for the approval of a certain project for sewage disposal. Certain general requirements were laid down by the State Board of Health which were followed. The final plans for this plant were submitted to the State Board of Health on February 20, 1912, and showed an Imhoff tank, a sand filter and a hypochlorite disinfecting plant. The sand filter was constructed, contrary to the advice of the Engineering Division of the Board, who recommended a percolating filter.

BECKER COUNTY.

Detroit—August 18, 1911, a request was made by the city clerk to investigate a complaint that the effluent of the city septic tank was creating a nuisance. The tank and surroundings were inspected on September 12. The tank was nearly full of sludge and in need of cleaning. The sewage ran through the contained sludge in a narrow channel and upon flowing from the tank was rather offensive. The ground adjacent to the tank was used as a city dump and the refuse was burned at intervals. The odors from the burning refuse were considerably more offensive than those from the effluent of the tank. It was recommended that the effluent of the tank be run in a pipe-line to the shore of Lake St. Clair, which had receded some hundreds of feet since the tank was constructed.

Frazee—The health officer of Frazee, on May 23, 1911, requested plans for a septic tank for general use. A plan for a tank for the treatment of house sewage was made and forwarded to him to provide for the conditions described.

BELTRAMI COUNTY.

Bemidji—On August 16, 1910, the health officer of Bemidji requested advice regarding a septic tank which the city proposed to install. The Northern Pacific Railway, also, because the tank was to be located near its property, was an interested party. Mr. M. D. Stoner, the city engineer, visited the office of the Engineering Division and was advised to build an Imhoff tank instead of a septic tank. Plans for a septic tank were prepared, which were reported upon as being capable of giving good results if the tank were properly constructed and operated. The tank was constructed in freezing weather, and the concrete later partially disintegrated. On June 15, 1911, an inspection was made. Later the city engineer wrote for information in regard to septic tanks and other methods of sewage disposal, which was furnished, together with references to literature on the subject. The tank was inspected again on December 4, 1911. In April, 1912, a further request from the city engineer regarding the operation of the tank was received, duly answered, and the advantages of the Imhoff tank for this locality again pointed out. No action has been taken by the city to date.

BIG STONE COUNTY.

Ortonville—The city clerk of Ortonville on September 12, 1910, asked for advice concerning the installation of a sewerage system in that city. Ortonville was visited on September 26, and an examination of the ground was made. Recommendations were made in regard to a sewerage system, and for the employment of an engineer to design the system. The plans were drawn and submitted to the State Board of Health for examination and were recommended for approval.

BROWN COUNTY.

Sleepy Eye—August 16, 1910, the health officer of Sleepy Eye requested advice in regard to sewage disposal. The conditions were investigated on October 31, 1910. There were many cess-pools and privy vaults in the city and a sewer was badly needed. Several plans were studied and finally it was recommended that the city employ an engineer to prepare detailed plans. A few years ago it was proposed to issue bonds for $60,000 for sewerage, but it was found at the time of this investigation that $20,000 would be sufficient.

CARVER COUNTY.

Norwood-Young America—The architect of the school building at Norwood-Young America called at the office of the Engineering Division and was given instructions in regard to the design of a settling tank for the school sewage.

CASS COUNTY.

Walker Sanatorium—In March, 1912, the health officer of Cass county stated that the sewage purification plant at the Walker Sanatorium was creating a nuisance from sewage flowing out on the surface of the ground. An inspection of the plant was made on March 15, and certain recommendations in regard to immediate relief were given. In April, 1912, the State Board of Control submitted plans and specifications for a filter bed for the sewage disposal system to the State Board of Health. These plans were reported upon as not being adapted to the situation, although the design was good from a purely structural standpoint.

CROW WING COUNTY.

Brainerd—Extended correspondence was carried on with the city engineer in regard to an improved sewerage system and sewage disposal plant. The city's request that a representative of the State Board of Health be sent to Brainerd to examine the situation was refused since the engineers of the Board were well informed as to the local situation.

DAKOTA COUNTY.

Randolph—On June 1, 1911, the health officer of Randolph asked for advice in regard to sewage disposal from private houses. He was given the information requested.

FARIBAULT COUNTY.

Delavan—A request was received on May 19, 1911, from the Health Officer of Delavan, for advice in regard to sewage disposal. An inspection of the ground was made on May 30, 1911, and an Imhoff tank and disinfecting plant recommended.

GOODHUE COUNTY.

Red Wing—The health officer of Red Wing, in May, 1912, asked for an investigation of a certain sewer in the eastern part of the city. On May 11 an inspection was made and it was found that the discharge of gas house waste into the sewer had formed a considerable deposit and that there was a peculiar odor of tar residuum accompanied by a sulphide odor from the man-holes below. A considerable deposit in the sewer of gravel washed in by storm water probably increased the odor from the gas house waste. The soil for some distance on each side of the pipe appeared to be permeated with gas given off by the liquid. In several basements examined, the same odor was noticeable. A recommendation was made that a separate tight sewer to the river be built to prevent a continuance of the nuisance.

HENNEPIN COUNTY.

Excelsior—A request was received on February 13, 1912, for advice regarding a sewerage system for Excelsior. A lecture was given to the citizens of this village on the general subject of "Sewerage and Sewage Disposal" on February 21, 1912. Since the Director of the Engineering Division had made studies of the local situation as a problem for University Engineering students, he was acquainted with the conditions and also was able to give the citizens an accurate idea of what was possible in sewage disposal for Excelsior.

ITASCA COUNTY.

Marble—The mayor of the village of Marble presented plans for a proposed sewerage system. The plans were carefully examined and recommendations were made that the combined system should be replaced by a sanitary system with storm water drainage to be taken care of separately. A plan was devised by which the cost of this system could be lessened about $10,000. The change in the design was not made and the above amount was wasted.

KANDIYOHI COUNTY.

State Inebriate Hospital—Plans for a sewage purification plant at the State Inebriate Hospital were submitted to the State Board of Health in March, 1912. Certain changes were recommended which were made, and the plans were finally recommended for approval.

Willmar—On March 6, 1911, a representative of the Board visited Willmar and addressed a meeting of citizens at the Commercial Club rooms on the subject of sewage disposal. Plans were later prepared for a sewerage system. At a special election bonds were voted in the sum of $10,000 by a three to one vote, for the purpose of constructing a sewerage system, pumping station and purification plant. Some legal technicality with this vote was discovered, however, which invalidated it, and a later city council decided to still further reduce the cost of the system by omitting the filter beds and also thereby saving the cost of installing and operating a pumping station. The mayor was told that if this were done, a nuisance would probably be created in time, and the city might be liable for damages and that the State Board of Health might order the installation of filters if complaints were made.

LAKE COUNTY.

Two Harbors—The city of Two Harbors has a sewerage system emptying through three outlets into Lake Superior. The polluted water of the lake occasionally sweeps by the intake of the public water supply, and following one of these occasions, in February, 1912, a serious typhoid epidemic occurred. It is entirely possible to purify the sewage as it flows into Lake Superior, but the expense would be great. The city is now bonded to its limit, so that for the present all that can be done is to disinfect the water supply, which will be an efficient protection against any danger to citizens from sewage contamination in the water.

LE SUEUR COUNTY.

New Prague—The mayor and the health officer brought up the question of a sewerage system for the village. The village authorities were advised that two years before an engineer has been employed to design a complete sewerage system, and that the plans had been examined and recommended for approval.

In April, 1911, information was furnished to private parties in New Prague in regard to cess-pools and septic tanks.

LYON COUNTY.

Tracy—The health officer of Tracy asked for assistance in regard to a sewer system in his city a number of times, but the advice given was not always followed. The city of Tracy has built a sewerage system which has been unduly expensive. In September, 1912, an engineer was engaged by the city to draw plans for an Imhoff tank.

McLEOD COUNTY.

Hutchinson—In August, 1910, the health officer asked advice in regard to sewage disposal. The situation in Hutchinson was peculiar in that several large creameries were emptying their waste into the river, resulting in a considerable nuisance. An investigation was made June 1, 1911, and definite steps for the purification of the sewage was recommended. It was hoped at the time that it would be possible to undertake at Hutchinson some experiments on the treatment of creamery waste, but it was impossible to make the necessary arrangements.

MARSHALL COUNTY.

Warren—In August, 1910, plans for a proposed septic tank for the city of Warren were submitted to the State Board of Health for examination. They were recommended for approval.

OLMSTED COUNTY.

Rochester Asylum—The State Board of Health was requested to send a representative to the Rochester asylum for the purpose of inspecting the sewage disposal works and recommending a means of bettering same. An inspection was made on January 25, 1911, and recommendations were made for using the settling tank already constructed, running the sewage through a pipe to the Zumbro river, if a survey proved such a plan feasible and within the cost allowed.

OTTERTAIL COUNTY.

Fergus Falls—On October 19, 1910, the Sewer Committee of Fergus Falls asked for advice in regard to the sewer for the Jefferson school of that city. On November 19 the conditions surrounding the school building were inspected and recommendations were made that the city engineer make a survey of a profile of a pipe line from the school to the river. This was done and a report made.

PENNINGTON COUNTY.

Thief River Falls—In 1910 the city engineer asked information in regard to the construction of a sewerage system. He stated that one had previously been designed for the city, the estimated cost of which was about $165,000. This sum would be utterly beyond the ability of a city of the size of Thief River Falls and the whole project was dropped. In September, 1912, an engineer was engaged to design a sewerage system, and he was given assistance in making new plans for a sewerage system and sewage disposal plant. On March 28, 1912, the ground was carefully examined and a report made. The engineer prepared plans with the assistance of this Division, and construction was begun. The saving to the city by the adoption of these revised plans will amount to over $100,000.

PIPESTONE COUNTY.

Pipestone—In January, 1911, the city attorney informed the State Board of Health that action was pending against the city for damages caused by the sewage of the city running across the land of the plaintiff, causing a nuisance. Advice was asked. The city attorney and the mayor called at the office of the Engineering Division and the subject was discussed. October 9-10 of the same year, the sewage purification plant was examined. The report on this inspection is given here in full, because it shows the character of the construction and the results of lack of attention to a representative Minnesota sewage purification plant.

REPORT ON VISIT TO PIPESTONE OCTOBER 9 AND 10, 1911.

Reason for Visit.

The writer was instructed by the Director of the Engineering Division to visit Pipestone for the purpose of making a detailed examination of the sewage purification plant at that place with a view of learning the causes of its partial failure.

Dr. H. M. Bracken visited Pipestone on September 21, 1911. In his report Dr. Bracken states: "This plant needs a thorough inspection by a competent engineer; first, in order to determine whether or not the septic tank is doing its work properly; second, in order to determine what should be done to the filter bed to bring it into practical operation; third, in order to give instructions to someone in the city of Pipestone for the proper care of both septic tank and filter bed."

History.

The plant consists of a septic tank, dosing chamber and percolating filter. The general plan shown in the blue print of the percolating filter attached to this report shows the arrangement of the plant. The septic tank was constructed at the same time as the sewerage system. The dosing chamber and percolating filter were added in 1908. Loweth and Wolff were the engineers for both the septic tank and the percolating filter.

Septic Tank.

The interior dimensions of the septic tank are 50 ft. long, 20 ft. wide by 8 ft. in depth. It is divided longitudinally into two compartments of unequal size, one being 8 ft., the other 12 ft. in width.

The outlet from the septic tank into the dosing chamber is over two weirs. The septic tank has been cleaned once a year, the studge being deposited in a sludge bed located near the septic tank.

The photograph (fiig. 3) shows what can be seen of the sludge bed and septic tank. There is no provision for allowing the sludge to flow by gravity from the septic tank to the sludge bed. When it is necessary to clean the tank, it is necessary for men to enter it and remove the sludge in buckets.

Dosing Tank.

The dosing tank is 8 ft. x 13 ft. inside. A 10 inch syphon discharges to a depth of 1 ft. 1½ in. About 850 gallons is discharged at intervals from 12 to 20 minutes. A leak in the syphon at present allows a small flow of sewage between discharges.

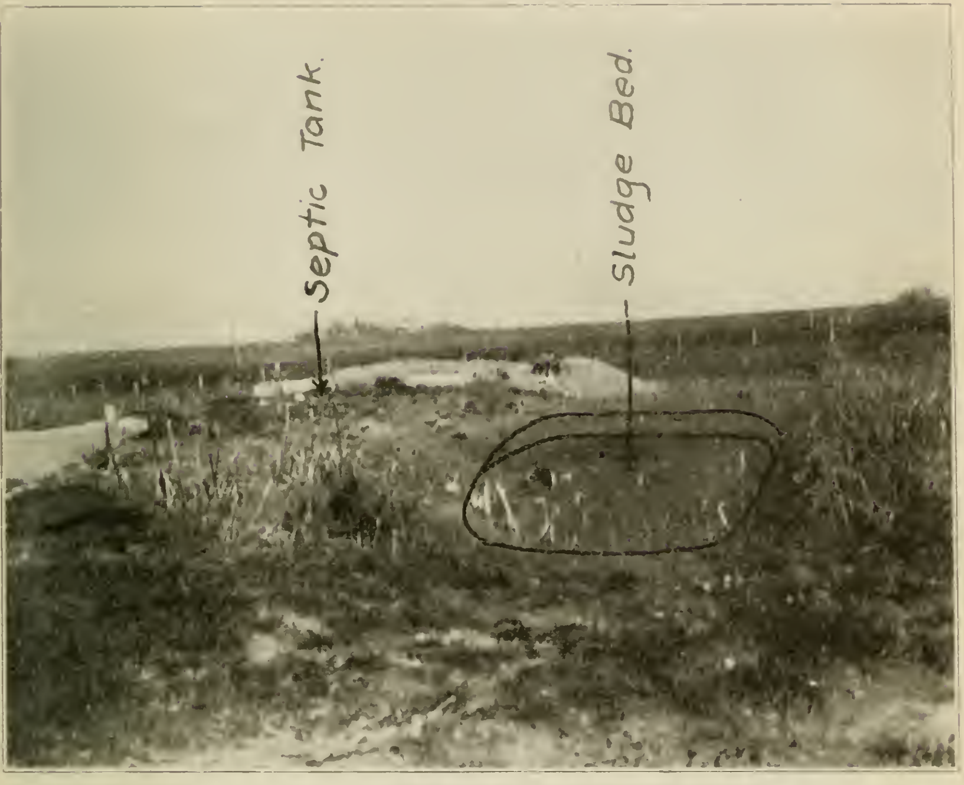


FIG 3—PIPESTONE.

Percolating Filter.

The filter is 50 ft. x 60 ft. in plan with a depth of 1 ft. The filter material is a crushed stone.

The plans called for material varying in size from ¾ in. to 2 in. The rock had evidently not been screened after passing through the crusher, at least there was enough material finer than ¾ in. size to interfere with the proper operation of the plant.

The sewage is distributed onto the filter by means of wooden troughs spaced 4 feet center to center. These troughs are laid on the surface of the filter, the sewage flowing from the troughs through 5-8 in. holes bored in the sides of the troughs near the bottom. These holes are spaced 10 in. center to center. Many of these holes were clogged at the time of my visit. (Noted in Dr. Bracken's report.)

Near the lower end of the filter a broken trough, since repaired, had allowed a large proportion of the sewage to be discharged onto the filter at this point. The filter at this point was so badly clogged that practically no sewage could pass through it. The following photograph (fig. 4) shows the layer of sludge which covered the bed at this point, in some places to a depth of over an inch.

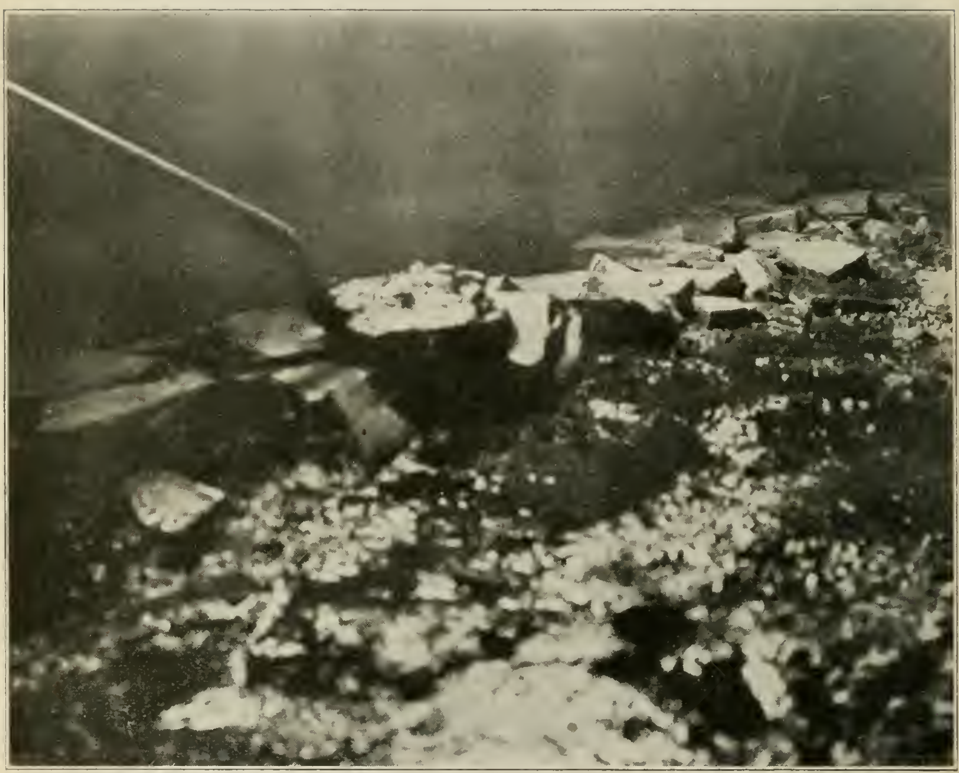


FIG. 4—PIPESTONE.

The filter under drains consist of 3 inch tile laterals laid 4 feet center to center with ½ inch to ¾ inch spaces at the joints. These laterals lead to two main longitudinal drains of special construction.

At the time of the writer's visit, practically all of the under drains were clogged, the sewage standing in the trenches around the filter. (Noted in Dr. Bracken's report.) The following photograph (fig. 5) is a view of the outside wall of the filter, showing the sewage in the trench and the tops of two of the under drains appearing above the surface of the sewage.

I had Mr. Dougherty, the superintendent, run a long pole into the drains and he was in this way able to loosen the sludge with which the drains were clogged so that the sewage and wet sludge standing around the filter was drained off to a considerable extent.

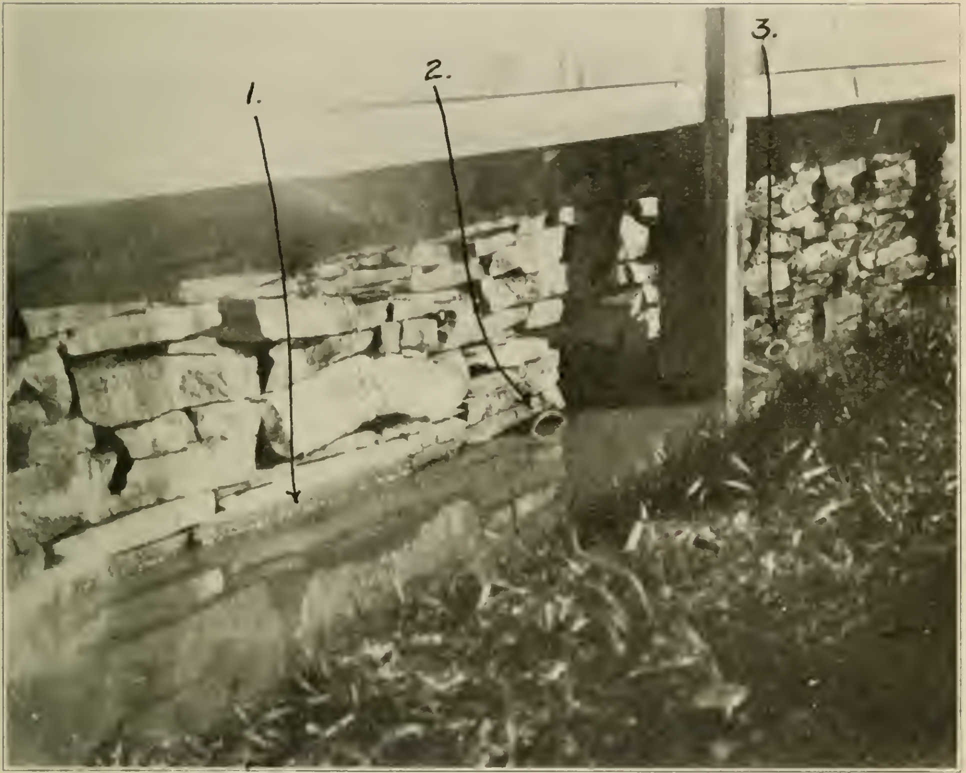


FIG. 5—PIPESTONE.

The photograph shown below (fig. 6) shows practically the same place as figure 5, but was taken a few moments after figure 5, and after one or two of the under drains had been opened. By comparing these two photographs, it will be seen that the level of the sewage had been lowered about three inches. In nearly every case Mr. Dougherty was able to loosen the sludge in the under drains.

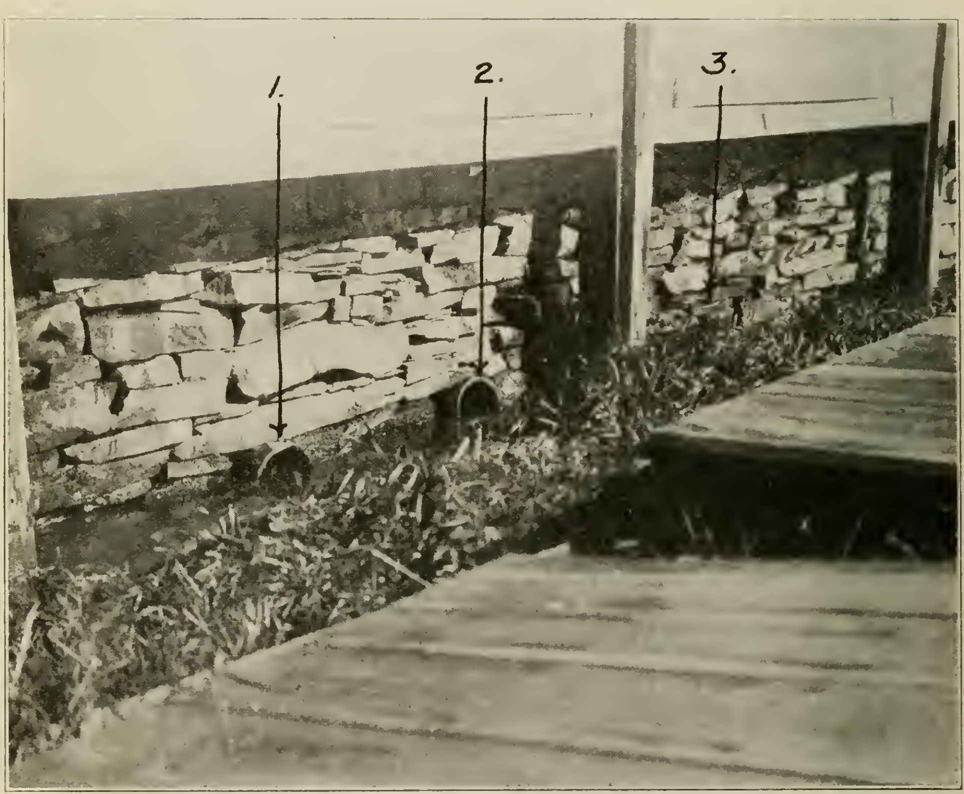


FIG. 6—PIPESTONE.

Outlet.

The filter effluent is discharged into a dry run which flows in a westerly direction from the city. The photograph (fig. 7) shows the present outlet into this dry run.

A 12 in. drain tile extension is now being laid along the course of the dry run, to a new outlet near the western line of section 12, township 106, range 46 west. This extension is costing the city $2,300. (Estimate of city clerk.)

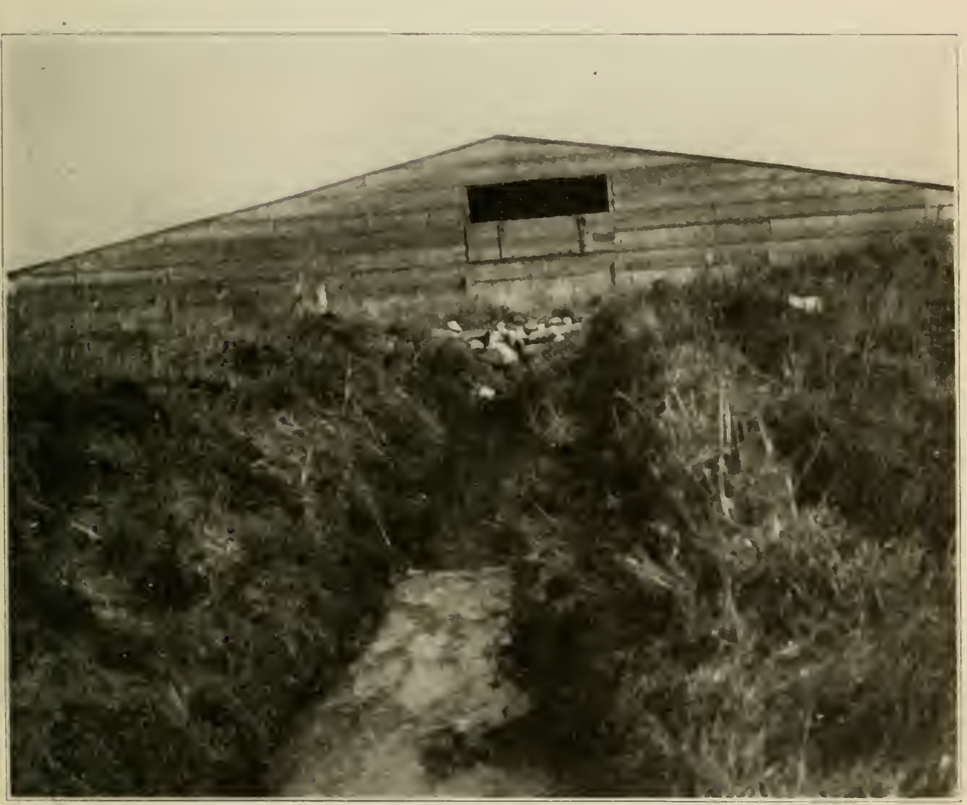


FIG. 7—PIPESTONE.

Summary and Conclusion.

Causes of putrescible effluent: Head and depth of filter too small. Filter overworked. (Rate 1,160,000 g. p. d. p. d.) Under drains not close enough together. (Half tile on concrete floor usual.)

Construction.

Filter material not of sizes shown on plans. Under drains poorly laid.

Operation.

Neglect in alowing troughs to remain broken and in not keeping them at proper level.

Neglect in not removing the sludge from septic tank often enough.

Neglect in allowing under drains to become clogged.

Neglect in not maintaining syphon so as to prevent flow between discharges.

The following recommendations are made:

(1) That the area of the filter be increased.

(2) That the syphon be repaired.

(3) That the troughs be repaired and readjusted, so as to distribute the sewage evenly over the filter.

(4) That the under drains be cleaned.

(5 That in the filter addition the under drains be 6 in. half tile laid 1 ft. center to center on a 6 in. concrete floor, the floor to be given the proper grade.

(6) That care be taken to see that the filter material be of material not smaller than 1½ in. and up to 2 1-2 in. in size.

(7) In order to obtain the best results from the present filter, it must be reconstructed, a concrete floor laid under it, with half tile under drains.

(8) A settling tank should be constructed to receive the filter effluent. This tank should have a capacity of about 150 cubic feet.

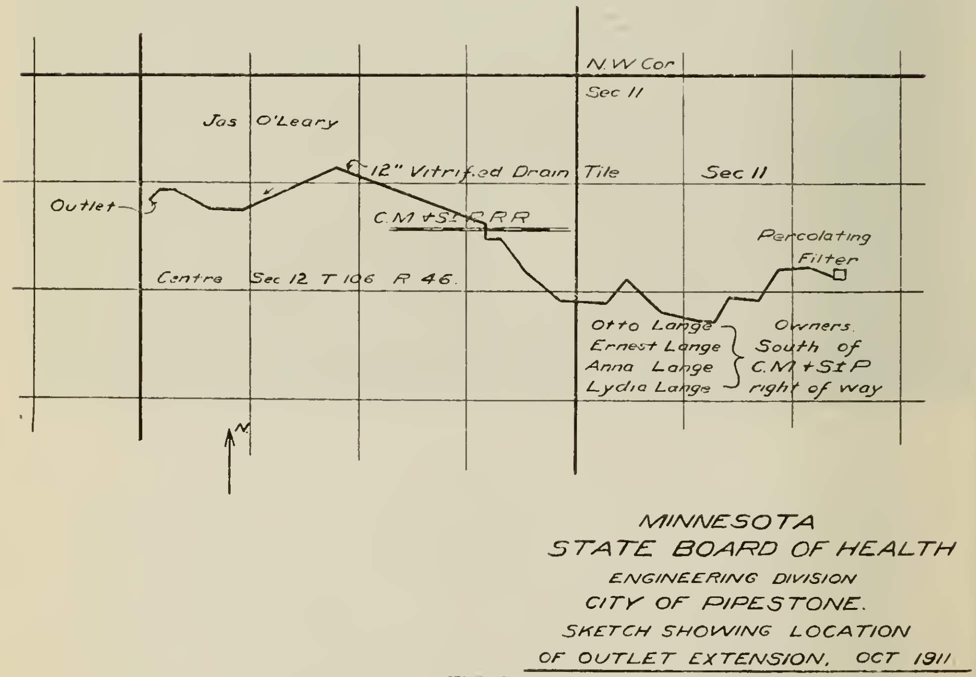


FIG. 8.

RAMSEY COUNTY.

White Bear—In November, 1910, the health officer called attention to the disposal of the waste from a laundry. Later the owners of the laundry were given an outline of plans by means of which relief might be obtained.

In 1911 an examination of the ground peparatory to giving advice in regard to the construction of a sewerage system was made. An approximate estimate of cost, together with certain definite recommendations in regard to the character of sewage purification plant required was given.

RED LAKE COUNTY.

Red Lake Falls—In December, 1911, the health officer asked for advice in regard to a sewerage system. Red Lake Falls was visited on March 27, 1912, and a report recommending the installation of a sanitary sewerage system with an Imhoff tank and disinfecting plant to purify the effluent, which was to be discharged into the Red Lake river, was made.

RENVILLE COUNTY.

Fairfax—On April 21, 1912, the health officer asked advice regarding the disposal of sewage from a school building already erected. A plan for a sewage disposal plant was sent, with explanations adapting it to the local conditions as described.

RICE COUNTY.

Faribault—The health officer of Faribault, on May 8, 1911, asked for advice in regard to a plan for a house septic tank which he expected to see used for locations where the general sewerage system was not accessible. The plan was critically examined and reported upon by the Engineering Division, and presumably adopted as revised.

Nerstrand—A citizen of Nerstrand called at the office of this Division on August 29, 1912, with plans for a septic tank to be used in making a connection with the drain laid along the main street of the town. This is another instance of the commonly attempted use of drains as sewers, a practice to be condemned.

SCOTT COUNTY.

Jordan Sanatorium—Advice was asked in regard to plans for a sewage disposal plant for the Jordan Sanatorium. It was suggested that the architect come to the office of the Engineering Division where help would be given in the design of such a plant.

ST. LOUIS COUNTY.

Chisholm—May 6, 1911, the health officer requested information regarding sewage disposal. A conference was arranged between the city engineer, the health officer and the Director of the Engineering Division, with the result that the city engineer submitted sketches, and later detailed plans, for a sewage purification works, in accordance with suggestions received from this Division.

Duluth—In September, 1910, a letter was received at the College of Medicine of the University of Minnesota requesting assistance in solving the problem of sewerage for Woodland Park. The request was promptly turned over to the Engineering Division of the State Board of Health. The situation was investigated. A rapidly developing residence section located about two miles from the lake shore was found to be provided with an adequate sewer emptying into the beautiful Tischer's Creek running through one of Duluth's finest parks, a stream accessible to children and others and dangerous on account of being polluted with sewage. It was found that relief might be had either by purifying the sewage at the creek or by constructing an outlet main to Lake Superior. For several reasons the latter plan was adopted.

A careful survey and study was made under the supervision of the Director of this Division, covering a period of several months. Special assistants paid by the citizens' committee were employed. Data, including an accurate census of the past and present population, number of sewer connections, amount of sewage flow, topography, and other factors entering into the problem, were carefully collected. A design for a sanitary system of sewerage and sewage disposal, and estimates of cost, were prepared.

The report on this survey was transmitted to the Executive Officer of the Board and to the citizens' committee above mentioned on February 20, 1911. The Director of this Division was asked to supervise a detailed survey and the design of a sewerage system after plans had been officially accepted by the city authorities, but his official duties prevented. He recommended an engineer who was employed. The sewerage system is now being built, and the saving to the city of Duluth over any previous plan is approximately $100,000.

Ely—November 3, 1910, the health officer of Ely requested advice regarding sewage disposal. On November 28 an inspector went over the ground. Crude sewage was found running into a stream running through the city to Shagwa Lake. The city engineer designated a sedimentation tank under the general direction of the State Board of Health. It was made plain to the city authorities that this tank in itself was approved by the Board, but that the discharge of sewage from it into the lake could not be approved under the law. The tank was constructed and an inspection made on June 24, 1912, showed it to be operating successfully.

Gilbert—A request was received that a representative of the State Board of Health visit Gilbert to see what could be done toward providing that city with a sewerage system. On July 12, 1911, an inspection was made. Later the city engineer of Gilbert asked for assistance in drawing plans for a sewage purification plant, which was given. This plant was built in the fall of 1911, and inspected December 3, 1911. The plant was again inspected on June 25, 1912, after it had been put into operation, and it was found not to be in the best condition. Definite recommendations for putting the plant in better shape were made.

Hibbing—In September, 1910, the health officer asked assistance in the preparation of plans for a sewage purification plant. Detailed plans were prepared. The plant was never constructed on account of the uncertaintty of the site occupied by the existing outlet of the sewer being a permanent one. Since that time the sewer outlet has been changed and a second request has come from Hibbing to design another purification plant for the new location. It has been decided that no construction will be undertaken during the summer of 1912. The new outlet will probably require a different type of plant.

Proctor—February 23, 1911, a citizen of Proctor asked for information in regard to sewage disposal, and requested that a lecture be given on the subject at a meeting of the Proctor Commercial Club. An investigation was made and a lecture given on April 11, 1911. No plant has been constructed.

Virginia—On February 22, 1911, the city attorney of Virginia requested advice in regard to a sewage purification plant for that city. In August a representative of the State Board of Health visited the city. The existing sewerage system had been giving considerable trouble in times of storm by allowing sewage to back up into the basements. It was intended to be a sanitary system only, but storm water inlets had been connected to it. No definite advice was given on account of lack of necessary data. A thorough examination of the creek in the neighborhood of the sewer outlet was recommended to be included in a general survey.

St. Louis County Sanatorium—In 1910 the Engineering Division of the State Board of Health made an examination of the grounds of the St. Louis County Sanatorium for the purpose of making recommendations in regard to water supply and sewage disposal. In addition to making the usual recommendations, the Division prepared full detailed plans and specifications for a sewerage system and sewage purification plant.

STEARNS COUNTY.

Albany—On October 23, 1911, the village recorder of Albany requested assistance in preparing plans for a sewerage system. An inspector visited Albany on November 10, 1911, and made the following report, which is given in full to show the work done in such an investigation.

REPORT ON TRIP TO ALBANY NOVEMBER 10, 1911.

Purpose of Visit.

The village of Albany, while it has a good municipal water supply, has no sewerage system and cess-pools are depended upon to care for the sewage from houses provided with plumbing. These have, in a few instances, caused trouble by overflowing, and led to agitation in favor of a sewerage system. The village authorities requested advice from Dr. Bracken who referred the matter to this division for investigation.

Conditions Found.

The writer arrived in Albany about noon on November 10, 1911, and spent the afternoon in investigating the conditions and in gathering data.

Topography.

The village is located on comparatively high land and between the Great Northern railway and the bed of what was once a lake, now drained and used for agricultural purposes.

Drainage.

A very small creek (dry except in rainy weather) once the outlet of the lake, occupies a small ravine west of the village. The natural drainage of the village is toward the creek and if a sewerage system is constructed, it would be the natural outlet. This creek eventually finds its way through several marshes into Two Rivers Lake. The outlet of Two Rivers Lake is the South Two Rivers, which empties into the Mississippi about ten miles below Little Falls. There are no municipalities on the Two Rivers below Albany near enough to be in any way affected by its sewage.

Purification Necessary.

The creek, however, is, except in time of heavy rains, so small that the discharge of even a small quantity of sewage into it would very likely cause a nuisance, locally and to farmers through whose land the creek flows. To effectually prevent such a nuisance, the sewage should be treated by sedimentation in an Imhoff tank, followed by a percolating filter, provided there is sufficient fall to operate the latter successfully.

Figure 1 is a view of the creek, looking down stream, after it has passed under the tracks of the Great Northern railway, and shows the character of the country which the creek flows through immediately after leaving the village.

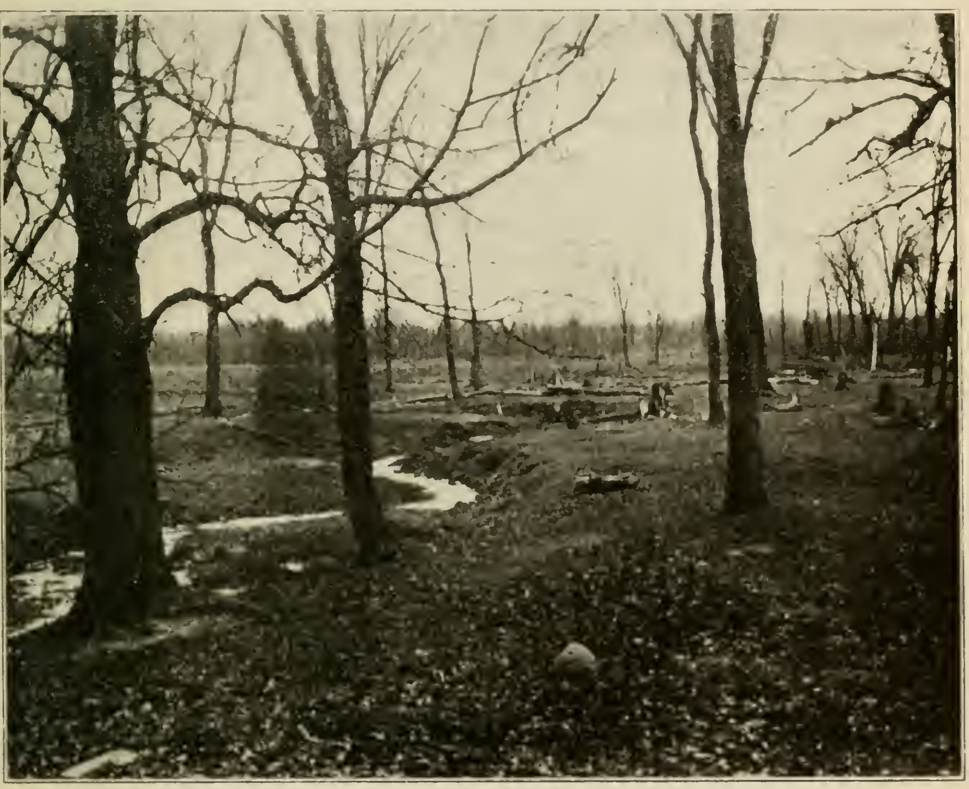


FIG. 9—ALBANY MINN., SEWAGE IS TO BE DISCHARGED INTO THIS CREEK.

Field Advice.

In the evening a special meeting of the council was called, which the writer attended, and spoke briefly outlining the various objects and processes of sewage purification and advising as to the proper steps to be taken before constructing a sewerage system.

Among those attending this meeting were Mr. Joe Lahner, mayor; Dr. Tolbert Watson, health officer; Mr. F. W. Christen, recorder; Mr. Matt Nett, councilman; Mr John Henry, concilman, and Mr. Adam Winter, councilman.

Summary and Recommendations.

1. Before commencing construction, plans should be drawn for a sanitatry system to cover the whole village. This may be built and added to from time to time as required.

2. To prevent a nuisance, sewage should be treated by sedimentation tank, preferably one of the Imhoff type, before discharging into the creek. If possible, the tank effluent should be treated by filtration through a percolating filter.

3. A creamery at present discharges its waste into the creek near its upper end. It is the intention to connect this creamery with the sewer. If this is done the creamery waste should first be separately treated in order that the raw waste may not interfere with the operation of the sewage settling tank or of the percolating filter, if one is constructed.

4. A competent sanitary engineer should be employed to draw the plans for the system. These plans before being reported should have the approval of the State Board of Health.

J. A. CHILDS,
Assistant Engineer.

The above report is approved, but with emphasis on the necessity for filtration after sedimentation. The wash water of the creamery should receive treatment before going into the sewer. Six days retention would probably be sufficient. The creek on which Albany is situated is a remote tributary of the Mississippi river and the necessity for a disinfecting plant is an open queston.

FREDERIC BASS.
Director.

The village later employed an engineer to draw plans, which were submitted to the State Board of Health for examination, and were made to comply with the requirements laid down by the Board.

Cold Spring—September 15, 1911, a request was received from the health officer for information regarding sewage disposal. A field examination was made and a set of plans for a sewerage system was found to be on file. A recommendation was made that these plans be altered in certain respects and a purification plant consisting of an Imhoff tank and disinfecting apparatus be added. No construction has been undertaken.

STEVENS COUNTY.

Morris—In September, 1911, the city engineer of Morris stated that a suit had been started against the city on account of damage resulting from the flow from the septic tank. An investigation of conditions was made on October 11, 1911, and a report submitted. The complaint was not an account of the sanitary significance of the sewage discharge, but on account of the fact that a water course was created.

TODD COUNTY.

Long Prairie—Plans for a sewerage system at Long Prairie were received for examination. They were reported upon, after certain necessary changes had been made.

WADENA COUNTY.

Wadena—A member of the city council of Wadena, in September, 1911, asked information in regard to plans for a proposed sewerage system. General information was given him, and he was advised to employ an engineer. On September 27, 1911, Wadena was visited and more definite recommendations in regard to the general design were given. In March, 1912, plans for a sewerage system were submitted to the State Board of Health for examination. On April 2, 1912, another trip to Wadena was made for the purpose of giving a lecture to the members of the council and the Commercial Club on the subject of sewerage.

WASHINGTON COUNTY.

Fairmont—In October, 1910, the health officer stated that the sewage filter beds were not in proper condition, and asked that an investigation be made. An inspection was made on January 12, 1911, which indicated that the sand filter had become clogged so that cleaning of the sand would be necessary before the filter could be used again. The septic tank was half full of sludge and it was discharging directly into Lake George. It was recommended that the sand filter be abandoned. In August, 1911, a member of the local Board of Health requested that further advice be given regarding the sewage disposal plant. Examinations of several projects for a new sewage disposal plant were made on the ground by the Executive Officer of the State Board of Health, the Director of the Engineering Division, and the consulting engineer of the city of Fairmont. The final result of the conference was that the problem was left to the city of Fairmont and its consulting engineer to solve.

YELLOW MEDICINE COUNTY.

Canby—A sewage purification plant was installed in Canby in 1910, on the advice of the State Board of Health. On May 10, 1912, an investigation of complaints regarding odors was made. The use of the sewerage system was not as general as had been anticipated and the sewage stood in the pump well longer than it should; also the check valve in the force main from the well to the septic tank had been omitted. Detailed recommendations were made and plans were prepared for the reconstruction of the septic tank. The recommendations were carried out, and the complaints ceased.

SUMMARY.

Trips of field inspection—40.

Advice by correspondence only—17.

PART III.—SCHOOL BUILDINGS.

Plans for school buildings are examined and reported upon to the executive officer of the board when they conform with the regulations passed by the State Board of Health.

Two hundred sets of plans and specifications have been examined and reported upon during the two-year period ending July 31, 1912. There have been very few inspections of buildings for the purpose of recommending improvements. A number of tests of jacketed stoves have been conducted at the request of the superintendent of public instruction.

In the coming year it will be possible to do more than merely to examine plans. It is proposed to engage the services of an architectural engineer, who will be available for giving expert general advice to school boards regarding school house construction in the same way that advice is now given to municipalities regarding water works and sewerage systems.

The school buildings reported upon have been classified and listed as follows, with respect to the county, location and number of rooms:

County.	Location.	District.	Number of Rooms.	Remarks.
Aitkin	Hill City	48	7	High and grade.
	Bain	101	1	
	Malmo	4	1	
Anoka	Columbia Heights	...	4	
Beltrami	Bemidji	3	4	
	Pinewood	92	1	
	Tenstrike	46	..	Remodeled.
Blue Earth	Indian Lake	72	1	Remodeled.
	Judson	7	1	
	Amboy	83	1	
	Garden City	16	4	
Brown	Comfrey	49	1	
		60	1	
		9	1	Heating and vent.
Carlton	Barnum	6	11	
	Moose Lake	3	4	
	Barnum	8	6	High and grade.
Carver	Watertown	32	10	High school.
	Chaska	19	1	
	Norwood-Young America	Consol.	12	High and grade.
Cass	Federal Dam	...	1	
Chippewa		7	2	
Clay	Glyndon	...	10	
		52	1	
Clearwater	Shevlin	1	2	
Cottonwood	Windom	...	9	High and grade.
	Jeffers	71	..	Heating and vent.
Crow Wing	Deerwood	7	8	
Dakota	Hastings	...	..	High school toilet.
	West St. Paul	4 schools	..	Inspections.
Dodge	West Concord	14	1	
	Mantorville	...	6	High school.
Douglas	Kensington	...	4	
		62	1	Heating.
	Carlos	55	..	Consol.
Faribault		122	1	
		103	1	
	Elmore	...	10	High school.
Fillmore	Spring Valley	...	12	High school.
		107	1	
		20	1	
	Lanesboro	...	4	Addition.
		17	..	

County.	Location.	District.	Number of Rooms.	Remarks.
Freeborn	Newry	2	1	
	London	...	2	
	Hayward	34	2	
Goodhue	Kenyon	...	14	Inspection.
Grant	Wendell	31	4	Heating and vent.
Hennepin	Minnetonka Beach	...	2	
		62	1	
		79	1	
		68	1	
		140	1	
	Crystal Bay	91	2	
	St. Louis Park	....	2	
	Glen Lake	...	2	
Houston	Brownsville	...	4	Heating and vent.
	Spring Grove	...	8	Heating and vent.
Hubbard	Hubbard	3	1	
Isanti	Braham	...	4	Ventilation.
Itasca	Cohasset	...	9	
Kanabec	Ogilvie	19	1	
Kandiyohi	New London	10	1	
		25	1 & 2	
	Raymond	84	1	
	Svea	68	1	
		77	1	
Kittson	Halma	40	2	
Koochiching	Hoaglund, unorganized	1	1	
	Lindford, unorganized	1	1	
	Steffis, unorganized	1	1	
		7	2	
	International Falls	...	2	
	Lomen	2	2	
	Birchdale	2	..	
	Gemmel	...	..	Remodeling.
	Indus	...	4	
Lac qui Parle	Louisburg	92	4	
Le Sueur	Le Sueur	1	4	
		29	1	
Lyon	Minneota	...	4	Addition.
	Garvin	47	4	
		57	1	
	Lynd	...	1	Ventilation.
McLeod	Stewart	...	4	Addition.
	Hutchinson	...	10	High school.
		11	2	
	Silver Lake	...	4	Addition.
Mahnomen	Waubun	...	..	Heating and vent.
	Mahnomen	...	4	Heating and vent.
Marshall		53	1	
	Holt	...	1	
Martin	Truman	...	6	Addition.
Meeker	Watkins	26	4	Inspection.
	Cedar Mills	...	1	
	Dassel	...	11	High school.
Mille Lacs	Wahkon	33	9	
Morrison	Randall	73	4	
	Buckman	41	4	
	Pierz	36	2	
Mower	Bennington	18	1	
	Leroy	12	..	Add. to high school
Murray	Lake Wilson	42	4	Inspection water supply. (See Lab. Rep., p. 338.)
	Avoca	28	4	Ventilation.
Nicollet	Traverse	3	1	
Nobles	Reading	...	4	Consol.
	West Side	64	1	
		111	1	
	Brewster	85	1	
	Rushmore	...	4	
Norman	Ada	...	3	Heating and vent.

County.	Location.	District.	Number of Rooms.	Remarks.
Olmsted	Rochester	...	6	Add. to high school
	Rochester	...	..	High school insp.
	Rochester	...	19	High school.
Otter Tail		108	1	
		140	1	
Pennington		56	1	
Pine	Hinckley	...	12	
	Rock Creek	15	1	
		92	1	
	Brook Park	24	7	
Pipestone	Jasper	...	10	
	Artichoke Lake	30	1	
	Holland	...	4	
	Edgerton	2	10	
Polk	McIntosh	...	9	
		45	1	
		282	1	
Pope	Glenwood	...	5	
	Farwell	...	1	
	Villard	5	11	
Redwood	Sanborn	17	7	Ventilation.
		21	1	
	Clement	...	2	Heating and vent.
		2	1	
		28	1	
	Delhi	...	4	Heating and vent.
Renville		72	1	
Rice	Morristown	...	5	Add. to high school
		16	1	
Rock		47	1	
		16	1	
	Steen	...	4	Remodeling.
Roseau	Swift	...	2	
	Roseau	...	13	High and grade.
	Roosevelt	76	8	
St. Louis	Meadowlands	50	7	
	Gilbert	18	16	High school.
	Floodwood	19	6	
	Alborn	33	2	
	Chisholm	Lincoln school	16	
	Aurora	13	12	High school.
	Mt. Iron	21	2	
	Mt. Iron	21	18	High school.
	Eveleth	31	10	
		25	1	
	Adriatic Location	13	2	
	Ely	12	6	Remodeling.
	Eveleth	39	10	
	Winton	12	7	
	Biwabik	24	13	High school.
	Arnold	30	6	
	Normana	32	1	Addition.
	Buhl	35	20	High school.
Scott	Knapp	39	1	Vent. test.
	Keystone	40	1	Vent. test.
	Belle Plaine	...	1	
Sherburn	Monticello	35	1	Heating and vent.
	Elk River	...	4	
Sibley	Winthrop	63	7	Add. to high school
Stearns	Lake George	156	..	Heating and vent.
	Belgrade	...	9	High and grade.
	Holdingford	93	4	Remodeling.
	Kimball	80	5	
	Paynesville	27	12	High school.
	St. Joseph	...	4	Heating and vent.
	Avon	...	8	Heating and vent.
	Sauk Center	...	16	High school.
Steele	Medford	6	2	
Stevens	Alberta	19	6	Consol.
	Hancock	...	10	
Swift	Kerkhoven	...	..	Remodeling high school.
Todd	Hewitt	103	4	

County.	Location.	Dis-trict.	Number of Rooms.	Remarks.
Traverse	Wheaton	32	4	Addition.
Wabasha	Mazeppa	...	4	Add. to high school
Waseca		43	1	
	Waseca	...	4	Add. to high school
Washington	Lake Elmo	17	2	
	Afton	45	1	
	Dellwood	54	2	
		5	1	
Wilkin	Andrea	24	1	
		75	1	
Winona		61	1	
		1	2	Addition.
	Kellogg	92	1	
	Dresbach	...	2	
Yellow Medicine	Granite Falls	...	1	

The above list includes:

1—20-room building
1—19-room building
1—18-room building
3—16-room buildings
1—14-room buidling
2—13-room buildings
7—12-room buildings
9—10-room buildings
3—11-room buildings
5— 9-room buildings
4— 8-room buildings
6— 7-room buildings
8— 6-room buildings
3— 5-room buildings
34— 4-room buildings
1— 3-room building
26— 2-room buildings
73— 1-room buildings

TESTS OF VARIOUS TYPES OF JACKETED STOVES USED FOR HEATING AND VENTILATING ONE-ROOM SCHOOLS.

The regulations of the State Board of Health, adopted May 1, 1912, state (149a): "A system of ventilation shall be capable of furnishing not less than thirty (30) cubic feet of air per minute for each person that the room will accommodate when the difference in temperature between the outside air and the air in the school room shall be thirty (30) degrees F. or more." (149e): "In buildings of four (4) rooms or less, equipped with jacketed stoves or furnaces, the fresh air intake and the chimney or vent flue shall have a cross section area equivalent to one-fourth (¼) of one per cent of the floor area of the room, but in no case shall the intake pipe be less than fourteen (14) inches in diameter, nor the chimney or vent flue less than sixteen (16) inches by sixteen (16) inches inside measurement."

Heating and school house men are so much at variance regarding the required size of flues that it was necessary for the engineering division to make tests of different types and makes of stoves upon the market, in order to ascertain just what could reasonably be expected from them.

It was conducted as a result of about fifteen tests that thirty cubic feet per pupil per minute could not be ordinarily obtained by any of the stoves tested, making the assumption that a class room would hold thirty pupils and that the difference of inside and outside temperatures was 40 degrees F. or less.

PART IV.—MISCELLANEOUS.

a. Dairy waste.
b. House sewage tank.
c. School sewage tanks.
d. Sanitary privy.
e. Converting septic tank to Imhoff tank.
f. University Weeks.
g. Suggestive plan for Imhoff tank.

DAIRY WASTE INVESTIGATIONS.

Scope of Work: Minnesota has an enviable reputation as a bread and butter state. There are at present eight hundred and twenty creameries in operation in Minnesota Many of these are so located that they are inaccessible to any large body of water into which the dairy wastes, including buttermilk, waste water, etc., may be discharged. Where a creamery is so located that the waste cannot be disposed of by dilution in some lake or river of considerable size, the problem is a serious one, since untreated waste discharged upon the surface of the ground soom becomes a nuisance to those living in the vicinity. The files of the State Board of Health contain many complaints of nuisances from this cause.

The regulations of the State Board of Health state in article number 104a: "Creamery waste or washings must not be discharged upon the surface of the ground or upon low places where it will remain during the process of decomposition, or into a slough, pond, lake or other body of stagnant or standing water."

The satisfactory treatment of this waste is a subject about which little is known. So called "septic tanks" are used generally for the treatment of dairy wastes. These tanks usually have from one to three compartments, and have concrete covers with manhole openings for cleaning. (See Plate 81a.) These tanks will, in most cases, operate with a fair degree of success until they become filled with sediment. Unless the tank is then cleaned, the waste will flow in a narrow channel through the tank, allowing no time for sedimentation. As a matter of fact, the tank is rarely cleaned at the proper time, since the cleaning is a very disagreeable operation.

Of these septic tanks, the three compartment type advocated by the Bureau of Animal Industry, United States Department of Agriculture, (see Plate 81a) while not adequate, is perhaps the least objectionable. The writer has seen tanks of this kind in use at Bertha, and Howard Lake, Minnesota. In both cases, the tanks were filled with sediment and there were complaints of nuisances.

Mr. Kimberly, of the Ohio State Board of Health, carried on a series of experiments on dairy wastes which are described in the Engineering Record of January 8, 1910. Mr. Kimberly states that the coagulated particles on entering the tank first fall to the bottom, but are soon borne upward by gas generated in the deposit on the bottom of the tank. This fact led the writer to believe that if the waste were passed through a tank of the Imhoff type the coagulated particles could be separated from the waste, producing an effluent freer from suspended matter than that from a septic tank, and one which might be further purified by filtration.

Experiments at Bertha: In April, 1912, a letter was received from the secretary of the Bertha Co-operative Dairy Association, stating that a new creamery was under construction and that advice was wanted regarding a suitable plant for the treatment of the dairy waste. An offer was made by the State Board of Health to furnish plans for a plant provided the creamery association would agree to build the plant as designed. The association agreed to this; the plans were prepared, and the plant constructed. (See Plate 83 [a].) The tank had, on the date of the last inspection, September 11, 1912, been in operation about two weeks. The filter was not yet in use. While the tank has been in operation entirely too short a time to determine the efficiency of this treatment, the indications are that a considerable portion of the suspended matter is being deposited in the lower compartment of the tank.

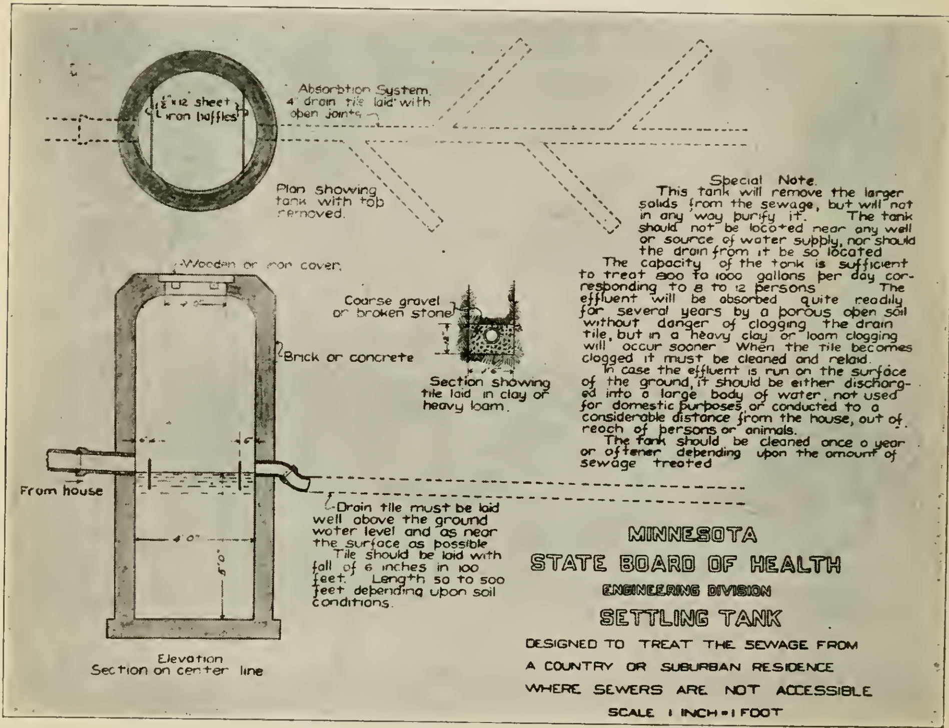
The following features of the problem are yet to be solved:

1. The determination of the time necessary for the greater portion of the suspended matter capable of settling to be deposited.
2. The devising of some economical means of disposal of the sediment removed from the battom of the tank.
3. The determination as to whether the tank effluent can be successfully filtered.
4. The determination of the most suitable filter material.
5. The devising of the best method of cleaning filter when clogged.

Credit is due the Bertha Co-operative Dairy Association for their part in furnishing the funds for the construction of this experimental plant. If the hoped for results are obtained, it will mean much for other creameries.

PLANS FOR HOUSE SEWAGE TANK.

Numerous requests reach the State Board of Health for information in regard to sewage disposal for private residences and institutions. These are often so distant that the cost of a trip of inspection, which is always desirable in such cases, is prohibitive. In order to give some assistance to the persons applying, a standard plan of a settling tank has been drawn. The tank is of permanent concrete construction, designed for the use of a large house or small hotel or institution. A descriptive note is shown on the drawing, calling attention to the fact that the tank does not purify sewage, but that its purpose is merely to make the sewage less objectionable and easier of disposal.


¼"×12" sheet iron baffles
Absorbtion System. 4" drain tile laid with open joints
Plan showing tank with top removed.
Wooden or iron cover.
Coarse gravel or broken stone
Brick or concrete
Section showing tile laid in clay or heavy loam.
1'6"
6"
6"
4'0"
5'0"
From house
Elevation
Section on center line

Special Note.
This tank will remove the larger solids from the sewage, but will not in any way purify it. The tank should not be located near any well or source of water supply, nor should the drain from it be so located

The capacity of the tank is sufficient to treat 800 to 1000 gallons per day corresponding to 8 to 12 persons The effluent will be absorbed quite readily for several years by a porous open soil without danger of clogging the drain tile, but in a heavy clay or loam clogging will occur sooner When the tile becomes clogged it must be cleaned and relaid.

In case the effluent is run on the surface of the ground, it should be either discharged into a large body of water, not used for domestic purposes or conducted to a considerable distance from the house, out of reach of persons or animals.

The tank should be cleaned once a year or oftener depending upon the amount of sewage treated

Drain tile must be laid well above the ground water level and as near the surface as possible

Tile should be laid with fall of 6 inches in 100 feet. Length 50 to 500 feet depending upon soil conditions.

MINNESOTA
STATE BOARD OF HEALTH
ENGINEERING DIVISION
SETTLING TANK
DESIGNED TO TREAT THE SEWAGE FROM
A COUNTRY OR SUBURBAN RESIDENCE
WHERE SEWERS ARE NOT ACCESSIBLE
SCALE 1 INCH = 1 FOOT

FIG. 11.

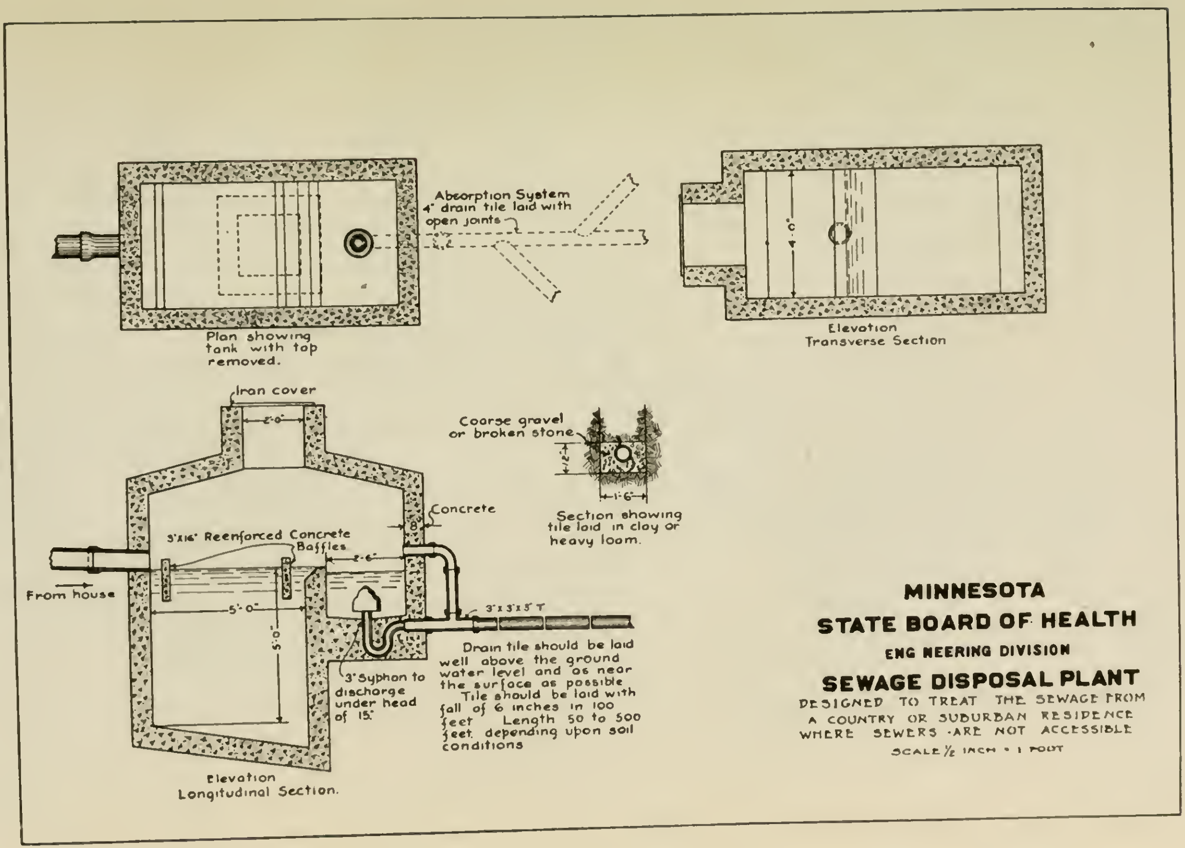
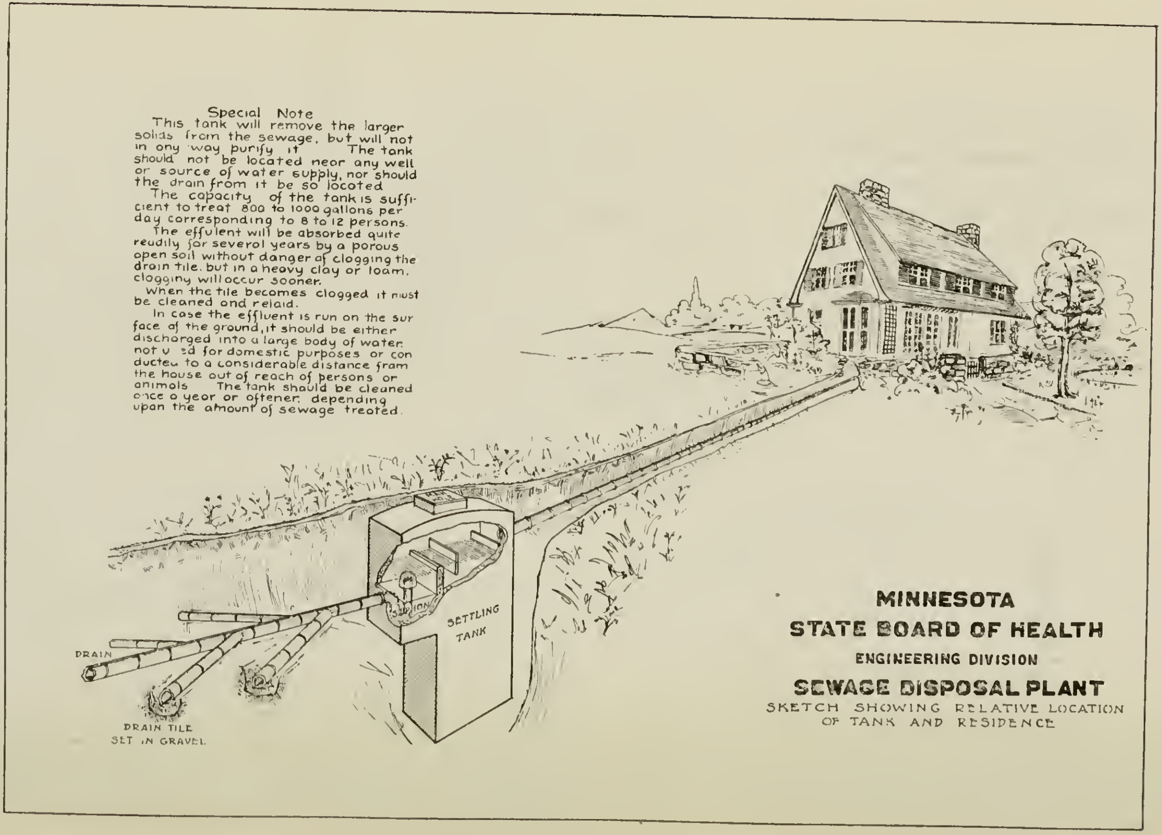

Absorption System
4" drain tile laid with open joints
Plan showing tank with top removed.
Elevation
Transverse Section
Iron cover
2'-0"
Coarse gravel or broken stone
1'-6"
Section showing tile laid in clay or heavy loam.
Concrete
8"
3"x16" Reenforced Concrete Baffles
2'-6"
5'-0"
5'-0"
From house
3"x3"x3" T
3" Syphon to discharge under head of 15"
Drain tile should be laid well above the ground water level and as near the surface as possible
Tile should be laid with fall of 6 inches in 100 feet Length 50 to 500 feet depending upon soil conditions
Elevation
Longitudinal Section.
MINNESOTA
STATE BOARD OF HEALTH
ENGINEERING DIVISION
SEWAGE DISPOSAL PLANT
DESIGNED TO TREAT THE SEWAGE FROM A COUNTRY OR SUBURBAN RESIDENCE WHERE SEWERS ARE NOT ACCESSIBLE
SCALE ½ INCH = 1 FOOT

FIG. 12.



Special Note

This tank will remove the larger solids from the sewage, but will not in any way purify it. The tank should not be located near any well or source of water supply, nor should the drain from it be so located.

The capacity of the tank is sufficient to treat 800 to 1000 gallons per day corresponding to 8 to 12 persons.

The effulent will be absorbed quite readily for several years by a porous open soil without danger of clogging the drain tile, but in a heavy clay or loam, clogging will occur sooner.

When the tile becomes clogged it must be cleaned and relaid.

In case the effluent is run on the surface of the ground, it should be either discharged into a large body of water not used for domestic purposes or conducted to a considerable distance from the house out of reach of persons or animals. The tank should be cleaned once a year or oftener, depending upon the amount of sewage treated.

MINNESOTA
STATE BOARD OF HEALTH
ENGINEERING DIVISION
SEWAGE DISPOSAL PLANT
SKETCH SHOWING RELATIVE LOCATION
OF TANK AND RESIDENCE

FIG. 13.

PLANS FOR SCHOOL SEPTIC TANK.

The new regulations for school houses require the presentation of plans for sewage disposal and it has been found that the architects of the state are, as might reasonably be expected, almost totally uninformed in the principles and practice of sewage disposal. In order to assist the architects with their plans and to facilitate the work of construction, the engineering

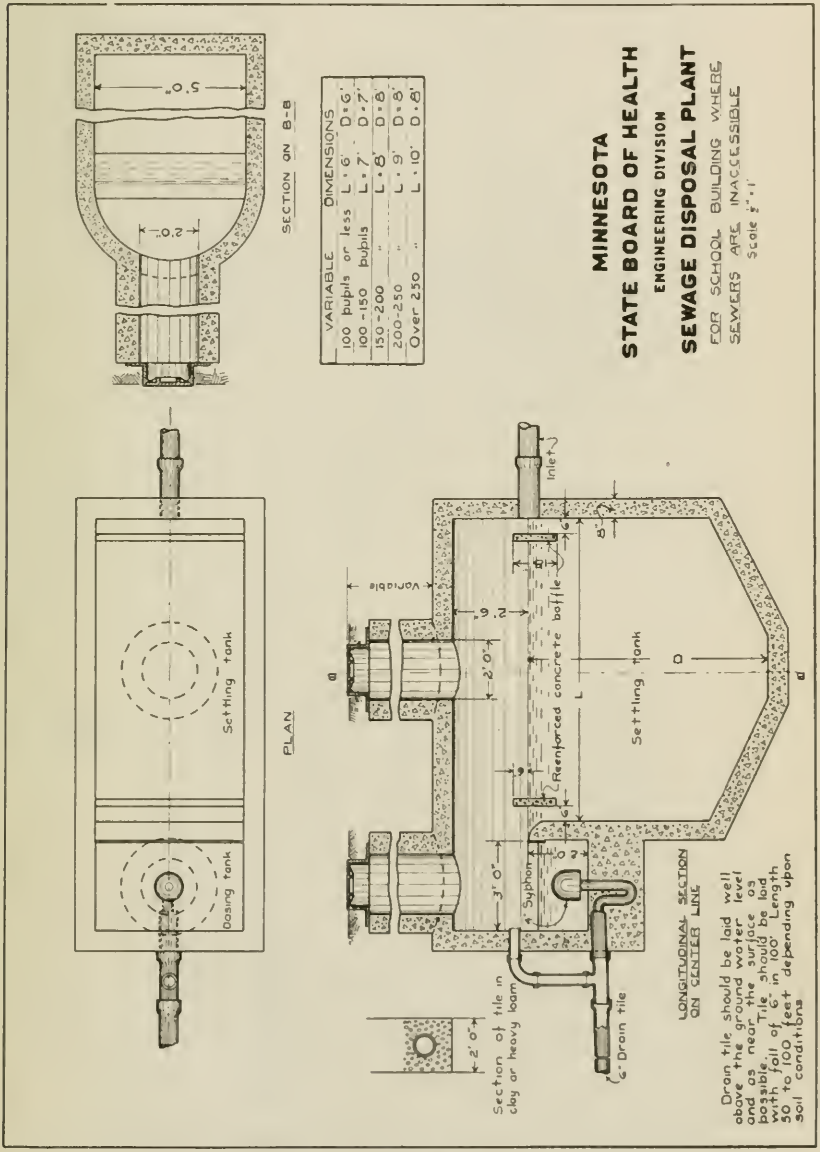

MINNESOTA
STATE BOARD OF HEALTH
ENGINEERING DIVISION
SEWAGE DISPOSAL PLANT
FOR SCHOOL BUILDING WHERE
SEWERS ARE INACCESSIBLE
Scale ⅛" = 1'
VARIABLE DIMENSIONS
100 pupils or less L = 6' D = 6'
100-150 pupils L = 7' D = 7'
150-200 " L = 8' D = 8'
200-250 " L = 9' D = 8'
Over 250 " L = 10' D = 8'
SECTION ON B-B
5'0"
2'0"
PLAN
Settling tank
Dosing tank
Inlet
Variable
2'6"
2'0"
3'0"
6"
8"
Reenforced concrete baffle
Settling tank
L
D
B
4" Syphon
6" Drain tile
Section of tile in clay or heavy loam
2'0"
LONGITUDINAL SECTION ON CENTER LINE
Drain tile should be laid well above the ground water level and as near the surface as possible. Tile should be laid with fall of 6" in 100' Length 50 to 100 feet depending upon soil conditions

FIG. 15.

division of the Board has prepared several suggestive designs for sewage purification plants. In the more important cases, it will be possible next year to make examinations of the ground and therefore to be of much more assistance to school boards than heretofore. Emphasis on the care of sewage purification plants after construction is invariably included in any advice given. (See Plates 86 (a) and 86 (b).)

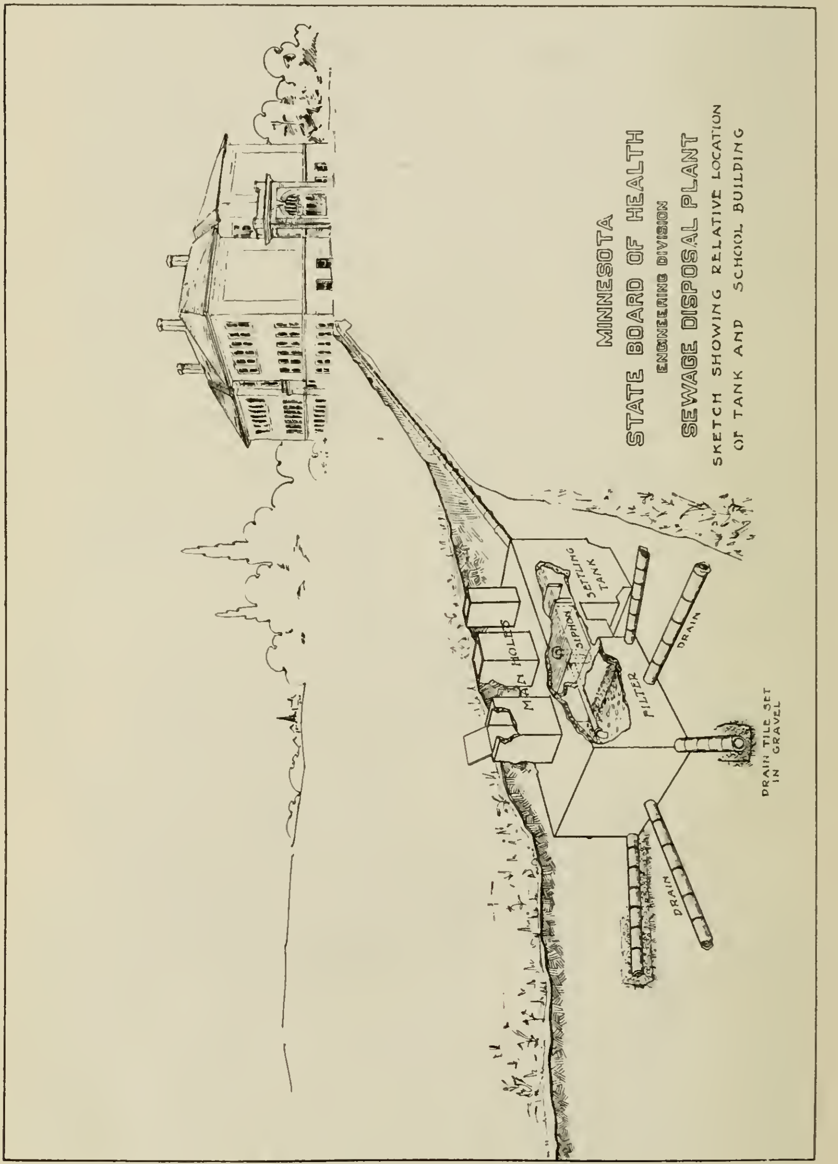
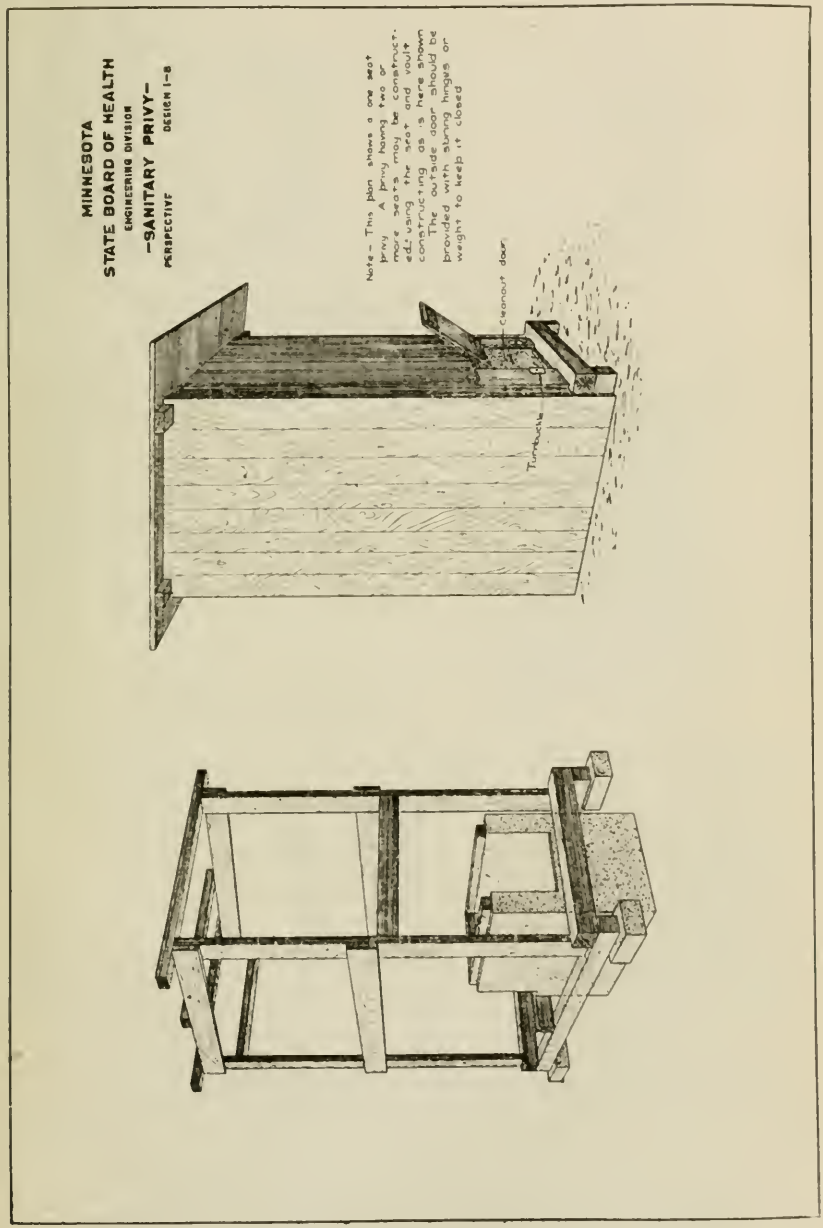


FIG. 14.

A design for a sanitary privy has been prepared from specifications laid down by Dr. H. M. Bracken, secretary and executive officer of the Board. (See Plate 86 (c).)



MINNESOTA
STATE BOARD OF HEALTH
ENGINEERING DIVISION
—SANITARY PRIVY—
PERSPECTIVE DESIGN I-B

Note— This plan shows a one seat privy. A privy having two or more seats may be constructed, using the seat and vault constructing as is here shown. The outside door should be provided with strong hinges or weight to keep it closed.

FIG. 16

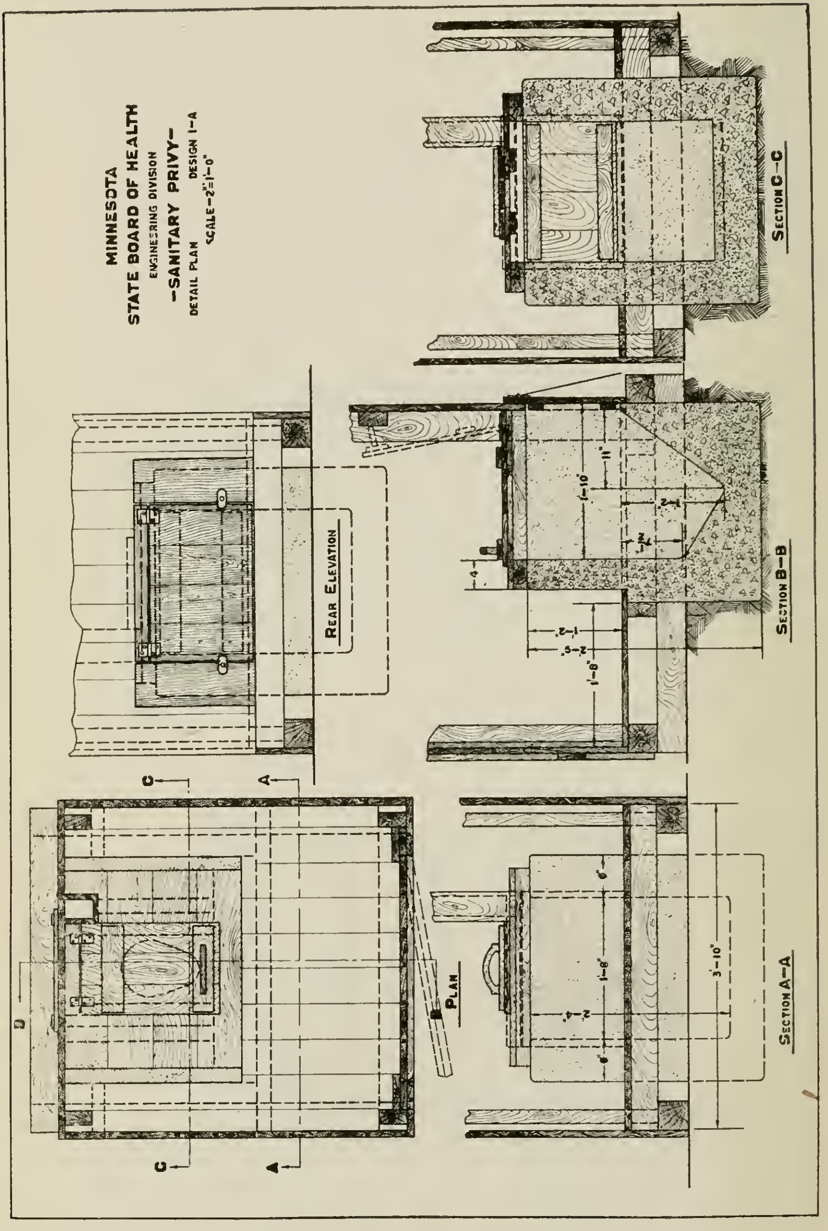

MINNESOTA
STATE BOARD OF HEALTH
ENGINEERING DIVISION
—SANITARY PRIVY—
DETAIL PLAN DESIGN I-A
SCALE—2"=1'-0"
REAR ELEVATION
PLAN
SECTION A—A
SECTION B—B
SECTION C—C
A
B
C
11"
1'-10"
1'-2"
4"
1'-2"
2'-5"
1'-8"
6"
1'-8"
2'-4"
6"
3'-10"

FIG. 16

REMODELING SEPTIC TO IMHOFF TANK.

There are many communities which, in the past ten or twelve years, have installed the septic tank to render their sewage less offensive before it is finally discharged.

The majority of these tanks have had but little attention; many have had no attention, the principal reason being that the whole time of a single person cannot be afforded and the village or city official to whom the duty of caring for the tank is entrusted ordinarily finds that the character of the effluent of the sludge of the septic tank make such duties exceedingly unpleasant.

The writer has seen many tanks nearly or quite full of sludge, the sewage as it flowed through merely taking a narrow winding channel across the sludge surface. This condition has been allowed to continue not only because of the reluctance on the part of the caretaker to clean the tank, but also on account of the expense of disposing of the sludge after it has been removed, it often being necessary to transport it in wagons to a considerable distance from the tank.

The remedy for such conditions is to provide an easy, cheap and inoffensive method of sludge disposal. There appear to be several experimenters at the present time seeking to find the solution of the problem in separate digestion tanks. The writer here presents a plan for converting a typical septic tank into an Imhoff tank, believing that therein will be found a satisfactory remedy.

This septic tank is divided longitudinally into two compartments. It is fifty feet long and the compartments are eight feet and twelve feet in width, respectively. The depth is eight feet six inches at the inlet end and eight feet at the outlet. (See Plate 88 (a).)

A study is presented here in two plates showing the method used in converting this tank into one which will embody the essential features of the Imhoff tank. In each compartment, the original space is partially filled with earth and covered with a concrete inclined slab; the settling chamber or upper story of each tank is formed by suspending from the roof a framework of angle irons upon which sheet iron is riveted. At the ends, baffle boards of wood are provided. (See Plate 88 (b).)

To form a sludge chamber for the narrow compartment, a long narrow well, sixteen feet in depth, is constructed parallel to and four feet from the outside wall of the original tank. In constructing this well, the outer wall would be put down as in the ordinary foundation. The inner wall, under the original tank, would be built as a series of posts, the intervening space between posts being filled in below but left open above to form a connecting channel with the old tank. The storage space provided for sludge is ample.

In the wider compartment, the sludge chamber is formed by perforating the bottom of the tank by seven circular wells each five feet in diameter, and affording a depth of seventeen feet below the water line. The usual methods of construction would be used in sinking these wells.

Sludge beds are not shown, but the usual type would be used.

The winters in the northwestern states are long and the sludge chambers must be large for that reason, but on the other hand, the sewage is weak and the total amount of sludge to be dealt with in the spring would probably be about the average.

Several Imhoff tanks have been constructed in Minnesota and it is the plan of the engineering division of the State Board of Health to gather data which will form the basis of more exact design for Minnesota conditions.

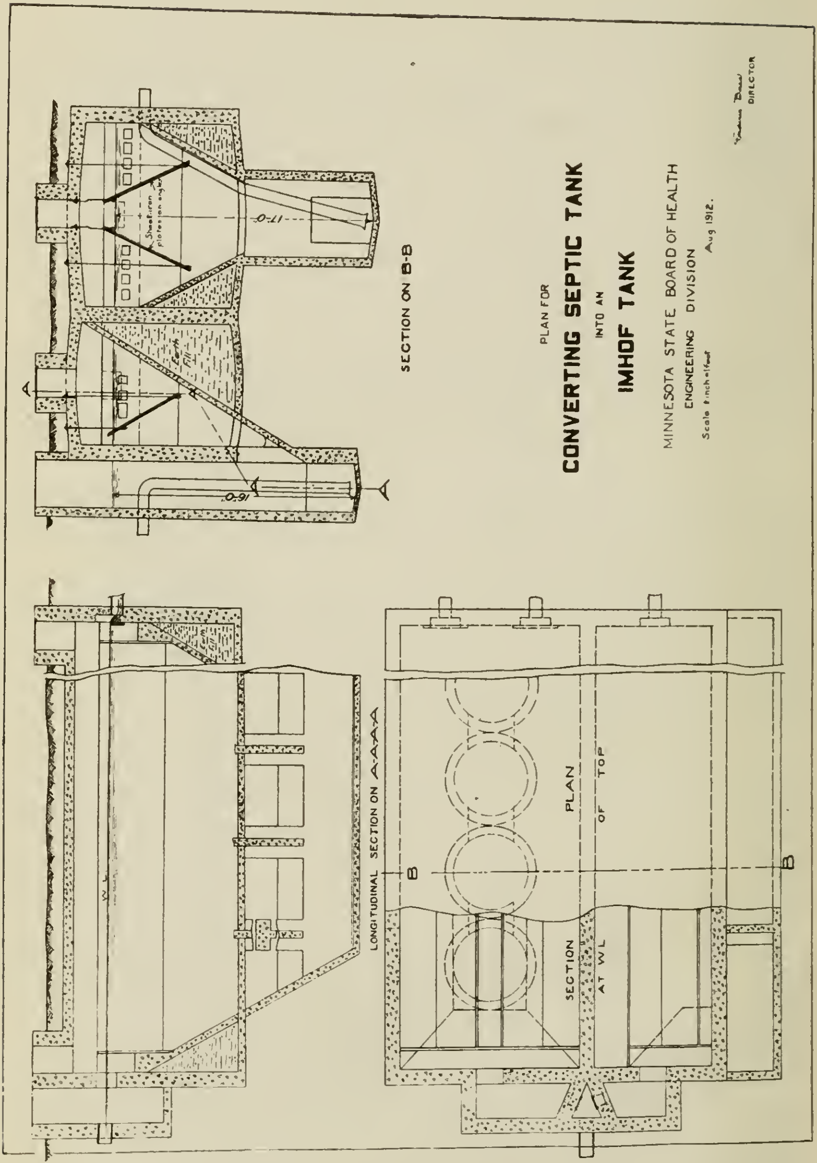


FIG. 17—IMHOFF TANK.

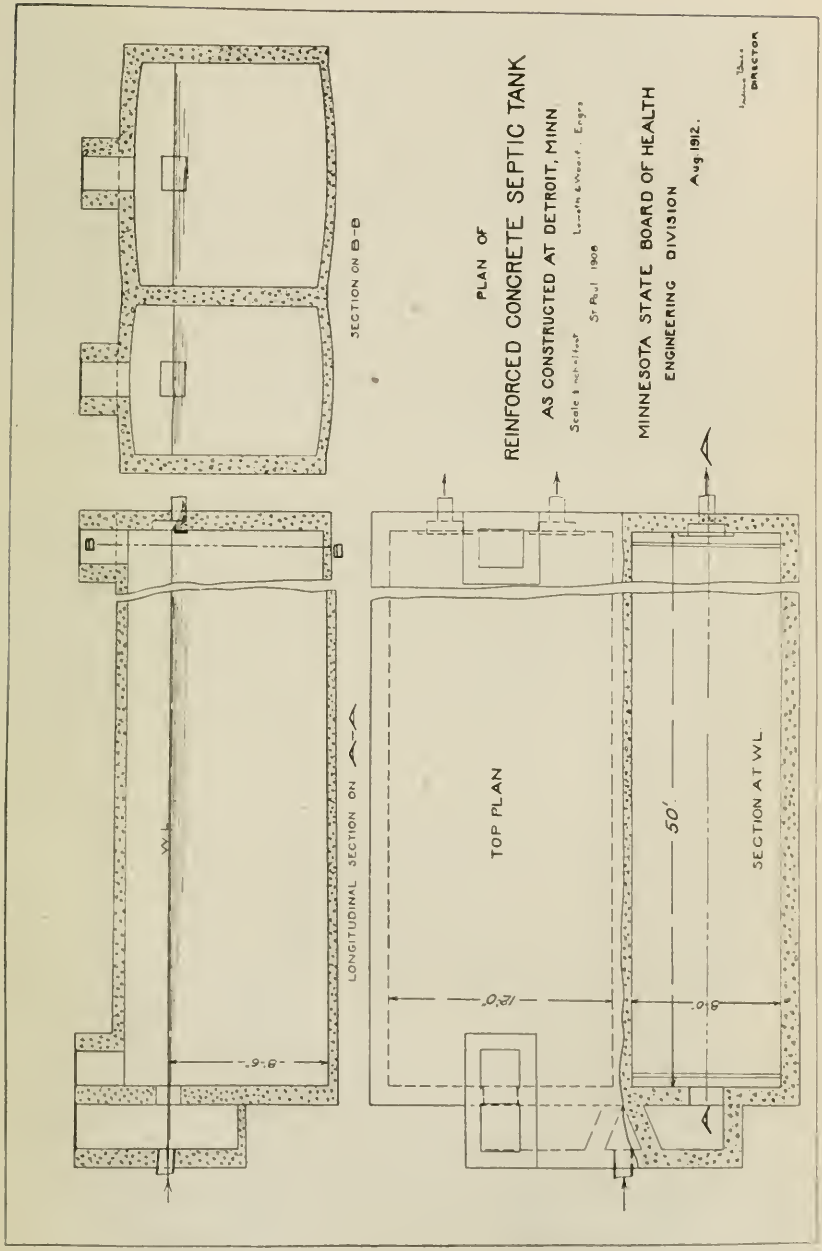

PLAN OF
REINFORCED CONCRETE SEPTIC TANK
AS CONSTRUCTED AT DETROIT, MINN
St Paul 1908
MINNESOTA STATE BOARD OF HEALTH
ENGINEERING DIVISION
Aug. 1912.
DIRECTOR
SECTION ON B-B
LONGITUDINAL SECTION ON A-A
W.L.
8'-6"
B
B
TOP PLAN
12'0"
SECTION AT W.L.
50'
8'0"

FIG. 18

UNIVERSITY WEEKS.

In June, 1912, the director of the engineering division was for the greater part of three weeks engaged in lecturing under the auspices of the extension division of the university of Minnesota. The cities in which lectures were given were: St. James, Luverne, Worthington, Windom, Owatonna, Grand Meadow, Bemidji, Crookston and Brainerd.

PLANS FOR IMHOFF TANK.

The introduction of the Imhoff tank as a means of clarifying sewage before it is discharged into a stream or before it receives further treatment, such as filtration and disinfection, has led to many inquiries from engineers, health officers, physicians, and contractors as to just what the Imhoff tank is like.

For the purpose of demonstration, plans have been prepared by the engineering division for an Imhoff tank designed to treat about 20,000 gallons of sewage per twenty-four hours. The sludge well will hold a six months' accumulation of sludge.

In places where no treatment of the sewage other than passing it through an Imhoff tank is desired, the dosing chamber is omitted. The dosing chamber is needed where the sewage, after passing through the tank, is further treated by filtration. The plans of this tank are shown below.

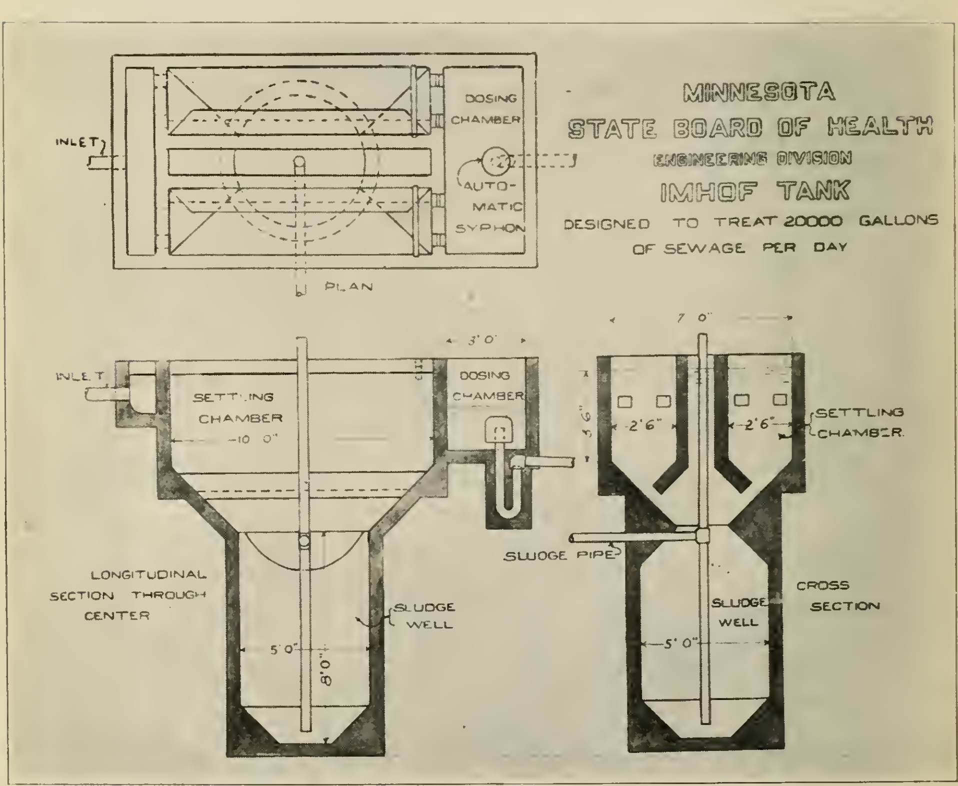


FIG. 19.

PART V.—CONCLUSION.

The work of the Engineering Division of the State Board of Health is capable of considerable advantageous extension.

The engineer is a man who has been trained to constructive work. To be successful in construction, to produce a structure to meet all of the requirements for which it is proposed, demands the full ingenuity of the designer and builder. There is almost always a limit to the resources available and one of the principal functions of the engineer is that of getting results with economy. It appears, then, that the object of the sanitary engineer is to postpone death and at the same time prevent taxes.

A survey of the past two years' work reveals a great amount of lost effort in the construction of public sanitary work, which means money lost. For instance; a city employed a man to design a sewerage system who did not have a great deal of experience which would fit him for the work he was called upon to do. He was, however, paid for work that had to be done over again. In another case, when construction was carried on according to an erroneous design, not only the money paid for the designer's time, but also a part or all of that larger amount put into the structures themselves, was wasted. In several cases, this repetition of needless work has been obviated, notably by cities whose city engineers have spent considerable time in the office of the Engineering Division of the Board in consultation with the director. This fact is mentioned to show that it is pracical for the Engineering Division to act as a consultant on such work and that in doing so it saves money to communities. No needless repetition of work is then necessary.

In other cases where plans had been drawn and the Engineering Division consulted, a saving to taxpayers of over $200,000 has been effected.

In order that such savings may be made with regularity, some method must be devised by means of which communities will automatically seek state assistance. It is here proposed that a system of state-aid for this purpose be established, and such a plan is outlined in the following paragraphs.

STATE AID TO MUNICIPALITIES.

To get the greatest benefits for the people for the least expenditure of money, or its equavalent in human energy, is the aim of the wise legislator and administrator. The one who acts most wisely is the one who has planned most thoroughly.

Whenever an act, such as the building of a school house, has to be repeated many times, it is economy to take advantage of the ideas already embodied in such buildings, or in other words, to use organized planning ability. The state has a Department of Public Instruction which controls the principal item of the people's expenditures, that for education. There is also in Minnesota a Highway Commission, which supervises the construction of roads. In each of these cases, the state has a distinct interest in efficient administration; its object is to see that each dollar spent yields a maximum return. Taxes are not burdensome when their proceeds are wisely used. Taxes raised for expert planning for better schools and better roads mean an actual saving to the communities in which the schools or roads are built. The state not only supports central bureaus of information and planning, but it also contributes funds to aid in construction.

On the same principle, the state might aid in the construction of those public municipal works which promote health and prevent disease. Communicable diseases do not respect municipal or county boundaries. No community lives to itself alone; it must respect the rights of other communities to life, health and happiness. Why should not those communities compelled by the state to build sewage purification works for the benefit of other communities receive aid from those other communities? These other communities together constitute the whole state. The diagram of the Mankato epidemic (page —) conclusively proves that the health of the whole state suffers where the health of a single community suffers. On looking at this diagram, one might easily imagine that a great bomb had been dropped on that city and that the hurtling fragments had been cast about the state, carrying destruction with them. Although this is not literally true, it is so in effect, for a person dying of typhoid fever is just as dead as a person killed by a bomb and the chances are that his suffering has been greater.

Municipal and county hospitals are among the greatest of the hygienic needs of the day. The isolation of patients suffering from communicable disease in comfortable and properly equipped hospitals, operated at public expense, would be one of the most profitable public expenditures. State aid here again would be most effectively applied for the public good.

A central bureau with experts in sanitary engineering and architectural construction in charge, would most economically accomplish the construction of the water works, sewerage and public buildings.

Cities and counties might, of course, employ their own engineers and architects, but they would be acting in co-operation with the State Board of Health in the same way that county superintendents of schools co-operate with the State Department of Public Instruction.

PUBLIC HEALTH AND LIFE INSURANCE.

Another phase of the economics of public health not generally recognized is that of the connection between public health and life insurance. There was in 1911 nearly $600,000,000 worth of life insurance in force in Minnesota, or about $300 for each man, woman and child. The premium receipts were about $10,000,000, or $5 annually per inhabitant. Improvement in sanitary conditions means postponement of death, but for this purpose each person in the state contributes on the average but three cents per annum. It has been estimated by Professor Fisher of Yale university, upon data specially collected from a large number of practicing physicians, that if the existing knowledge of the means of disease prevention were but used, the span of human life would be lengthened fourteen years. Every effort, then, to extend the application of sanitary science prolongs life and prevents disease. It also has another effect, not so important, to be sure, but one worth considering. It prolongs the period during which a person pays his insurance premiums—that is the reason why the leading thinkers among life insurance men are beginning to be interested in the public health. A life insurance company is undoubtedly a most beneficient institution, and it carries relief to many an unhappy household. The company is taxed by the state, and it would seem that such a tax was against public policy in that it penalized a most desirable semi-public activity. If the tax is more than sufficient to sustain the life insurance division of the Insurance Commissioner's office, such excess should be used for the benefit of the company taxed.

As a matter of fact in Minnesota, the tax on life insurance companies amounted to $165,000 in 1910. The estimated cost of operating the life insurance portion of the Insurance Commissioner's office was in the same period not over $15,000. The surplus $150,000 should be used for some purpose beneficial to the payer of the tax.

The only way in which this money could be expended by the state for such purpose would be for the promotion of the public health. In other words, the State Board of Health should have at the very least an annual appropriation of $150,000.

The engineer thus sees in general public health work, as in that of his particular specialty, the economic side; and this report is concluded with two suggestions, one for the purpose of increasing the efficiency of the work of the Engineering Division of the Board by the enactment of a law granting state aid to municipalities which comply with the sanitary requirements laid down by the State Board of Health, and the other for the purpose of directing attention to the fact that the state can well afford to and should from the revenues derived by taxation of the life insurance companies, devote $150,000 per annum for the promotion of the public health. An increased tax on life insurance companies might justly be demanded if it were applied to the benefit of the public health.

The reason for this discussion in an engineering report is that the engineer in public health brings to bear on the problems presented, the idea of measurement. There are many activities of public health bodies which do not render returns commensurate with the outlay, and as it has always been the main aim of engineering to accomplish the most at the least expense, the engineer has developed a quantitative sense, which in combination with the medical and technical acumen of the physician should result in greater efficiency of effort.

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